AD-A118 011 ARMY PROCUREMENT RESEARCH OFFICE FORT LEE VA F/G 15/5
GUIDELINES FOR THE APPLICATION OF COMPETITION.(U)
JUN 82 W B WILLIAMS
UNCLASSIFIED APRO-905 NL

AMSAA

ARMY PROCUREMENT RESEARCH OFFICE

APRO 905

FINAL

GUIDELINES FOR THE APPLICATION OF COMPETITION

JUNE 1982

Approved for Public Release; Distribution Unlimited

U.S. ARMY MATERIEL SYSTEMS ANALYSIS ACTIVITY
ARMY PROCUREMENT RESEARCH OFFICE
FORT LEE, VIRGINIA 23801

APRO 905

FINAL

GUIDELINES FOR THE APPLICATION OF COMPETITION

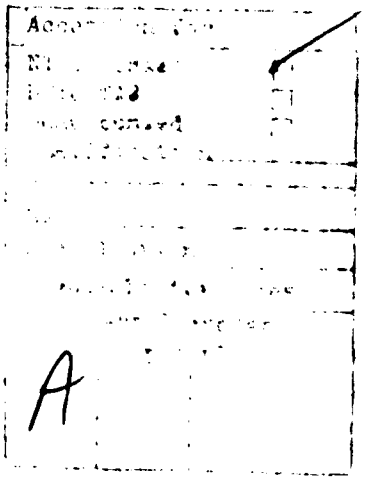
by

William B. Williams

The pronouns "he," "his," and "him," when used in this publication, represent both the masculine and feminine genders unless otherwise specifically stated.

Information and data contained in this document are based on input available at time of preparation. Because the results may be subject to change, this document should not be construed to represent the official position of the US Army Materiel Development and Readiness Command.

Army Procurement Research Office
Army Materiel Systems Analysis Activity
Fort Lee, Virginia 23801



EXECUTIVE SUMMARY

A. BACKGROUND. Competition has been hailed by virtually every corner of the public and private sectors as a motivation for efficient and effective cost and technical performance. In the field of acquisition competition is acknowledged as a powerful force that will result in the attainment of optimal bids and proposals from the market place. Many studies of competition have been conducted in recent years. Yet there has been no attempt within the Army to consolidate the results into a cohesive picture of competition. A need exists for a single document that describes the current status of price competition efforts within the Army and the Department of Defense.

B. PURPOSE. The purpose of this study was to develop a guide on production competition which could be used by acquisition personnel responsible for formulating competition strategies. The specific objectives were to describe the conceptual background of competition, to explain the types of competition, to examine the factors which affect competition, to describe the methods commonly employed to achieve competition, and to provide guidelines for the application of the methods.

C. PRESENTATION. The report concentrates upon the methods currently employed by the Department of Defense and the Army to enhance competition on production contracts. Included are the following methods: Technical Data Package (TDP), Form, Fit and Function (F^3) Description, Leader/Follower (L/F) Procurement, Educational Buy, Directed Licensing, Contractor Teaming, Associate Contractors, Component Breakout, and Multiyear Contracting. Covered in the discussion are characteristics of the methods, advantages and disadvantages, DOD experience with the techniques, and the circumstances which favor or support the applicability of the various methods. Also discussed are the factors which influence competition, such as production quantities, amount of funding, system complexity, and production leadtime. A matrix is provided which shows the interrelationship among the methods of competition and the variables which influence competition. While the report primarily addresses price competition on Army acquisitions, it also includes coverage of technical/design competition. Other topics are also included, for example, an analysis of recent competition statistics and a brief review of the competition savings methodology currently employed to calculate anticipated dollar savings from competition.

D. SUMMARY AND CONCLUSIONS. The Technical Data Package remains the dominant competition method. But a combination of methods is often necessary to achieve the most effective competition strategy. Creating second sources is a process which generally takes time and money. Hence, early planning for production competition is vital. The commitment to competition must be strengthened at all levels of Government. Official endorsements of competition must be supported by funding and substantive competition plans.

TABLE OF CONTENTS

TABLE OF CONTENTS (CONT'D)

TABLE OF CONTENTS (CONT'D)

TABLE OF CONTENTS (CONT'D)

TABLE OF CONTENTS (CONT'D)

TABLE OF CONTENTS (CONT'D)

LIST OF FIGURES

LIST OF TABLES

CHAPTER I

INTRODUCTION

A. BACKGROUND.

Competition has been hailed by virtually every corner of the public and private sectors as a motivation for efficient and effective cost and technical performance. In the field of acquisition, competition is acknowledged as a powerful force that will result in the attainment of optimal bids and proposals from the market place.

Continued interest in competition at the highest levels of Government has prompted a number of studies throughout the Federal establishment. The Department of Defense (DOD), in particular, has sponsored a significant number of competition studies. In spite of the various reports, there has been no attempt to consolidate the results of the research into a cohesive picture of competition. Certainly, competition is too large a subject to encompass in a single study. Nevertheless, DOD decision makers and practitioners need a document that describes the current status of competition efforts. Such a document should address, inter alia, the modes of competition, the conditions impeding competition, and the various strategies or alternatives for achieving competition.

B. STUDY OBJECTIVES.

The objectives of this study are to:

1. Describe the conceptual background of competition.

2. Explain the types of competition, to include price competition and technical/design competition.

3. Examine the factors which affect competition, such as item complexity, schedule, quantities and the market place.

4. Describe the strategies commonly employed to achieve competition, to include:

a. Technical Data Package (TDP)

b. Form, Fit and Function (F^3) Description

c. Leader/Follower Procurement

d. Educational Buy

e. Directed Licensing

f. Contractor Teaming

g. Associate Contractors

h. Component Breakout

i. Multiyear Contracting

5. Provide guidelines for the application of the competition methods.

C. STUDY APPROACH.

In conducting this research, considerable reliance was placed upon data and conclusions drawn from previous studies conducted by both Governmental and nongovernmental organizations. Among the organizations which have been actively involved in investigating competition on Department of Defense acquisitions are Congressional committees and staffs; the General Accounting Office (GAO); Rand; Logistics Management Institute (LMI); The Analytical Sciences Corporation (TASC); Putnam, Hayes, and Bartlett; and the Institute for Defense Analyses (IDA); and a number of Army, Navy, and Air Force activities. A thorough literature search identified many studies and articles which addressed competition. The sources were critically evaluated and became the basis for much of the study. Interviews were conducted with key acquisition personnel in the Department of Defense. These included contracting officials and project management personnel. Additionally, contract files were reviewed and competition statistics gathered and

analyzed. The conclusions of the research have been synthesized into the chapters which follow.

D. SCOPE.

The research includes an account of status and trends of competition in the Army and Department of Defense. Design and price competition are differentiated and put into perspective. The emphasis, however, is upon price competition. The primary focus in the report is on the methods of competition--the specific techniques which have been employed to increase competition on Government acquisitions. These methods are described elsewhere in the Defense Acquisition Regulation (DAR) and in briefings, reports, and articles. The purpose here is to expand on the coverage provided in other publications and to summarize the information in a single document. Factors influencing competition are identified and interrelationships among the factors and competition techniques are explored.

CHAPTER II

OVERVIEW OF COMPETITION

A. *INTRODUCTION.*

Competition is a cornerstone of the US capitalistic system. The preeminence of our nation's economic system can be attributed, in large measure, to a commitment to competition. The benefits of competition in the private sector are well established--technological innovation and, in most instances, lower prices and better quality. Through the years Congress has stressed the need for promoting and extending competition in Government buying. The DOD has implemented the Congressional policy in a number of ways. The DAR includes methods designed to enhance competition in all phases of the acquisition cycle. Many contractual studies and in-house reports have addressed the problem of how to achieve competition on specific programs. Other studies have assessed the benefits of competition. Competition statistics are compiled and thoroughly analyzed. Areas of weakness are identified, and corrective measures are thoroughly explored.

B. TYPES OF COMPETITION.

Two types of competition are possible on defense acquisitions--design/technical competition and price competition (Figure 1). As pointed out in a previous Navy study, design and price competition must be recognized as independent concepts.[1] The two approaches serve different purposes. There is no evidence to support the "carry over" theory which holds that design

---

[1] Benjamin R. Sellers, Competition in the Acquisition of Major Weapon Systems, AD A078268, Naval Postgraduate School, Monterey, CA, September 1979, p. 16.

Life Cycle	Type of Competition (Primary Emphasis)
Alternative Systems	Design/Technical
Demonstration and Validation	Technical/Design (Paper or Prototype)
Full-Scale Development	Technical/Design and Price
Production	Price

FIGURE 1. TYPICAL TYPES OF COMPETITION

competition leads to a lower priced system in production.[2] While each type of competition is needed to motivate defense contractors and each should be an integral part of an overall acquisition strategy, their independence should be acknowledged.

Concentration in this report is upon price competition. This is the type of competition which has been emphasized by Congress and the Department of Defense. For it is price competition on production contracts that offers the greatest potential for cost reduction on defense acquisitions.

1. Price Competition.

Price competition refers to the situation where the Government specifies its need and relies on the market forces to determine the price it pays for the product or service meeting that need.[3] For price competition to exist, the Government must have a clear definition of its requirements and competent rival sources must be available and willing to satisfy the need. A primary difference between price competition and design competition can be noted in the preceding definition. Price competition is dependent upon explicit specifications; a primary objective of design competition is the development of precise technical descriptions.

---

[2] Ibid., p. 17.

[3] Richard P. White and Myron G. Myers, Competition in DOD Acquisitions, Logistics Management Institute, Washington, DC, May 1979, p. 1-1.

The DAR reference to price competition states that:

> Price competition exists if offers are solicited and (i) at least two responsible offerors (ii) who can satisfy the purchaser's (e.g., the Government's) requirements (iii) independently contend for a contract to be awarded to the responsive and responsible offeror submitting the lowest evaluated price (iv) by submitting priced offers responsive to the expressed requirements of the solicitation.[4]

In the context of this study, price competition applies to production contracts for military supplies. Production competition then is the process of obtaining competitive offers from two or more independent, qualified manufacturers for the production of identical, or functionally identical, hardware or software systems.[5]

The thrust of the remainder of this report is to identify and discuss a variety of techniques currently employed to insure or encourage "offers from two or more qualified manufacturers."

2. Design or Technical Competition.

Design or technical competition takes place when a contract award among competing firms is based primarily on design or technical considerations. While price is addressed in the award decision, it is not normally weighted as heavily as technical factors. However, it should be stressed that Design to Unit Production Cost (DTUPC) provisions are included in contracts for the development of major systems. This assures that the ultimate production price for the system is emphasized throughout the development cycle.

---

[4] Defense Acquisition Regulation (DAR) 3-807.1 (b)(1)a, Office of the Secretary of Defense, Washington, DC, July 1976.

[5] Sellers, p. 18.

Design or technical competition is usually found in the research and development phase. It takes two forms.

The first is prototype hardware competition which occurs most often in advanced development and is a product of the Department of Defense initiatives of the early 1970's. Under the prototyping procedure, awards are made to two or more competing companies to build prototypes to meet system performance requirements. After the hardware prototypes are built, their performance is evaluated. The hardware judged to best meet the Army requirements is the winner. Again it is emphasized that the technical quality is of primary importance, although price is not ignored. The winning company is awarded an engineering development contract for further development of the system.

The second form of design or technical competition is based upon competition among proposals. As with the first form, the technical characteristics of the proposal are given greater weight than cost elements. The firm submitting the best proposal will be awarded the contract. Normally, this method too is used in contracting for research and development. In summary, the similarities of the two forms of technical competition are that both place primary emphasis upon technical factors and are usually used in contracting for Research and Development (R&D). The difference is that in prototype competition, evaluation is made of the "hardware" while in proposal competition, evaluation is made of "paper" designs.

A Rand report evaluating acquisition policy made a number of interesting observations pertinent to technical competition.[6] A question

---

[6] Edmund Dews et al., Acquisition Policy Effectiveness; Department of Defense Experience in the 1970's (R-2516), Report prepared for the Under Secretary of Defense for Research and Engineering, The Rand Corporation, Santa Monica, CA, October 1979, p. 25.

addressed in the report was whether or not programs which had undergone hardware competition in development had fared better than those which had not. Result-goal ratios were computed for 31 programs. The result-goal ratios were obtained by dividing the development estimates (goal) into the current (most recent) estimates (CE) for performance, schedule and cost. The calculations provided indicators of progress toward goals. Rand researchers acknowledged certain weaknesses in their data sample; hence, they only offered a tentative answer to the question posed above. That answer supported the policy of hardware competition. The hardware competitive programs had slightly better performance and schedule ratios and substantially less cost growth. The mean cost-growth ratio was 1.16 compared with 1.53 for the programs with little or no hardware competition. An unpublished Rand study which was referenced in the acquisition policy report dealt with Air Force prototyping experience. On three of the programs, Air Force personnel doubted that the designs and contractors selected for final development after prototype hardware tests would have been the ones selected if only paper designs had been evaluated. Although unable to quantify, Rand said that it was "reasonable to conclude" that a better weapon system resulted from the development of competitive hardware prior to full-scale development.

A number of Army programs which are currently in production went through prototype hardware competition. Examples are the competition on the UH-60A Black Hawk helicopter between Sikorsky (United Technologies) and Boeing-Vertol, with Sikorsky the winner; and the M-1 Abrams Tank competition between Chrysler and General Motors, with Chrysler the winner. While prototype evaluation has apparently proved its merit, one important point needs

to be made. The initial costs of buying two or more prototypes for evaluation will considerably exceed the costs of going into research and development with a single contractor. In other words it takes more money in the early stages of system development to conduct this form of competition.

A discussion of technical competition is incomplete without a brief look at the current Government policy on the subject expressed in the Office of Management and Budget Circular A-109, Major System Acquisitions. The Circular instituted the MENS (Mission Element Need Statement) and restructured the first two phases of the Acquisition Cycle.

The first phase of the cycle is referred to as EXPLORATION OF ALTERNATIVE SYSTEM CONCEPTS (EASC). As the name would imply, the sole purpose of the EASC phase is to explore and identify alternative concepts for satisfying a mission need. Competition is emphasized in order to select the best possible solutions from all sources--industry, educational institutions, Government laboratories, other services and/or foreign developers. Once all system concept alternatives are analyzed, the most promising candidates are selected to move forward for demonstration and validation. The purpose of the DEMONSTRATION AND VALIDATION (D&V) PHASE is to more fully develop selected alternatives in order to determine their potential for fulfilling the mission need. This phase may involve the demonstration of several alternative concepts; it may be limited to a single concept; or it may involve only alternative subsystems. In selected cases, it may be omitted entirely. Upon completion of this phase, a decision will be made as to which concepts have demonstrated sufficient promise to warrant continued development. The most promising candidate(s) will enter into

the FULL SCALE ENGINEERING DEVELOPMENT (FSED) PHASE.[7] Implicit in the A-109 policy is more competition among concepts and the introduction of technical competition earlier in the acquisition cycle. Future Army acquisitions are expected to reflect this philosophy.

One useful perspective on the topic of Design/Technical Competition is revealed in the relative proportion of design versus technical competition (Table 1). As a percentage of total contract dollars, design or technical competition dollars in the Army have narrowly ranged from 6.6% in FY 75 to 7.0% in FY 80--although rising as high as 8.5% in FY 76. As a percentage of total competition, technical competition rose from 13.6% (6.6/48.4) in FY 75 to 18.9% (7.0/37.0) in FY 80. Typically, surprise is expressed at the low percentage of contract dollars which are awarded as a result of design/technical competition, in light of the major system buys of recent years. But it must be remembered that development costs are not the big dollar item. In the life of a system it is the production contract dollars which dominate. Hence, it is easy to understand why so much emphasis is placed on competition in production.

C. SOLE SOURCE ACQUISITIONS.

1. General.

As a policy DOD in DAR 3-101 discourages the use of noncompetitive contracts for production of military systems. The reason for this position is twofold. The restrictiveness is potentially damaging to the integrity of the competitive bidding system and the sole source producer is placed

---

[7] Duane D. Knittle and Robert F. Williams, Acquisition Strategy Development, APRO 904, Army Procurement Research Office, Fort Lee, VA, February 1981.

DA PROCUREMENT STATISTICS*

FISCAL YEARS 75-80

COMPETITION (PERCENTAGE OF DOLLARS)

	75	76	77	78	79	80
COMPETITIVE PRICE						
FORMAL ADVERTISING	17.0	16.2	14.4	10.3	10.1	10.2
NEGOTIATION	24.8	22.8	19.7	21.9	21.6	19.8
COMPETITIVE DESIGN/TECHNICAL	6.6	8.5	8.1	7.7	6.0	7.0
TOTAL COMPETITIVE	48.4	47.5	42.2	39.9	37.7	37.0
NONCOMPETITIVE						
FOLLOW-ON	6.2	5.0	6.6	7.4	9.8	13.6
OTHER	45.4	47.5	51.2	52.7	52.5	49.4
TOTAL NONCOMPETITIVE	51.6	52.5	57.8	60.1	62.3	63.0

*Source: Department of the Army Procurement Statistics, FY 75-FY 80, Headquarters Services, Washington Procurement Statistics Division, HQDA, Washington, DC.

TABLE 1. DA PROCUREMENT STATISTICS

in an advantageous bargaining position during contract price negotiations. Because of these shortcomings negotiation of noncompetitive contracts for systems acquisitions must always be justified. While the DAR does not specifically address what information is required to justify noncompetitive procurements, the General Accounting Office has developed a set of questions for contracting officers to review when contemplating noncompetitive procurements.[8] The Deputy Under Secretary of Defense (Acquisition Management) has recommended that contracting officers consider these questions (Appendix A) prior to making the sole source decision.[9] While the memorandum does not require contract file documentation in response to the questions, the answers should be useful in supporting the noncompetitive determination. It has often been said that cost analysis cannot take the place of competition in its impact on price. As a result higher prices can be expected on noncompetitive contracts.

The preceding discussion does not imply that sole source contracts are always objectionable. In fact, circumstances may not favor competition in specific acquisitions of major systems. System complexity may have necessitated such a substantial initial investment by the developer/sole source that no other producer can logically be expected to compete with him. Or quantities to be produced may be so small that competition is

---

8 General Accounting Office, DOD Loses Many Competitive Procurement Opportunities, Report to the Honorable Stephen Solarz, House of Representatives, By the Comptroller General of the United States (PLRD-81-45), July 29, 1981.

9 The Deputy Under Secretary of Defense (Acquisition Management), Memorandum for the Assistant Secretaries of Military Departments, SUBJECT: Competition in Defense Procurement, 3 Nov 1981.

impracticable. The variables are dealt with in more detail elsewhere in the report (Chapter IV). It suffices to state here that forcing competition on a program that should be sole source may lead to severe consequences. Hardware quality may deteriorate. Delivery schedules may be unacceptably lengthened. Contract modifications and program costs may rise significantly. Thus, acquisition planners should not take the position that competing a major system is always the most efficient strategy. On the other hand, as also noted in Chapter IV, even a major sole source system may offer opportunities for competition at the subsystem level.

2. Leverage.

In planning acquisition strategies for major DOD programs, leverage is a frequently discussed term. A dictionary definition states that leverage is an increased means of accomplishing some purpose. In the context of acquisition or contracting, leverage normally applies to the threat of competition. The purpose of competition in this sense is lower costs of acquisition. The threat of competition to the developer is the means of inducing the developer who may become the sole source producer to keep his proposed price reasonable. Thus even if it is unlikely that competition will take place during the production of a major system, project offices and contracting organizations may want to reserve the right to compete in their acquisition plans. The leverage is a legitimate technique for holding costs down.

D. ARMY EXPERIENCE.

In spite of the attention given to competition, Army procurement statistics of recent years have shown an erosion of competition during most of the period (Table 1). Note that from FY 75 - FY 80 there was a

significant increase in the percentage of Army procurement dollars awarded without competition. In 1975 51.6% of contract dollars were awarded without competition while in 1980 63% of awards were noncompetitive.[10] The trend was the same throughout DOD. Noncompetitive awards in DOD averaged 64.3% in FY 80. The Navy, Air Force and Defense Logistics Agency percentages were 69.6%, 67.1% and 59.9% respectively.[11] (While the analysis in this paragraph is tied to the FY 75 - 80 procurement statistics, FY 81 DOD statistics became available after the draft report was written.[12] These statistics reflect a change in Army procurement which is encouraging. The noncompetitive percentage for Army contracts decreased to 61%, the first decrease in seven years. The noncompetitive percentages for the Navy, Air Force and Defense Logistics Agency were 74.1%, 66.2% and 29.9% respectively. While the Navy experienced a significant increase in noncompetitive awards during the year, both the Air Force and DLA showed improvement--with the DLA shift being dramatic.)

Competition statistics within DARCOM are also shown (Table 2). Competitive contract dollars as a percentage of all contract dollars slipped from 31.7% to 21.2% from FY 75 to FY 80. In other words, sole source awards in FY 80 amounted to 70.8% of all procurement dollars. The

---

10 Department of the Army Procurement Statistics, FY 75 - FY 80, Headquarters Services, Washington Procurement Statistics Division, HQDA, Washington, DC.

11 Department of Defense, Military Prime Contract Awards, Fiscal Year 1980, Washington Headquarters Services, Directorate for Information, Operations and Reports, Washington, DC.

12 Department of Defense, Military Prime Contract Awards, Fiscal Year 1981, Washington Headquarters Services, Directorate for Information, Operations and Reports, Washington, DC.

DARCOM PROCUREMENT STATISTICS*

FISCAL YEARS 75-80

COMPETITION (PERCENTAGE OF PROCUREMENT DOLLARS)

	FY 75	76	77	78	79	80
COMPETITIVE PRICE	31.7	29.6	25.8	24.8	23.7	21.2
COMPETITIVE DESIGN/TECHNICAL	8.5	10.4	9.5	8.8	6.7	7.9
TOTAL COMPETITIVE	40.2	40.0	35.3	33.6	30.4	29.1
NONCOMPETITIVE	59.8	60.0	64.7	66.4	69.6	70.8

*Source: Army DD Form 350, Individual Procurement Action Report, Files - DARCOM HQMIS.

TABLE 2. DARCOM COMPETITION STATISTICS

impact of major system production contracts which are noncompetitive is reflected in Table 3. Note that the trend in FY 79 and 80 was decidedly upward. Given that circumstances do not always permit competition or that competition is not always desirable, the trend away from competition was nevertheless disturbing to Congress, the Executive Department, and officials within the Department of Defense and the Army. During Congressional hearings of 1979 the Secretary of Defense and the Deputy Secretary were questioned at length as to why competition was decreasing and what actions were being taken to reverse the trend. The response of the Deputy Secretary was to issue a Memorandum entitled "Need to Increase Competition in Defense Acquisitions."[13] The Memorandum, which was sent to all Departments of the Department of Defense, called for each of the secretaries to "develop a plan designed to improve competition in all phases of all acquisition programs."

The Army plan to increase competition combined initiatives previously undertaken and in the process of being implemented and renewed emphasis on traditional concepts and methods.[14] In addition, the plan described a number of new initiatives which had been undertake... These included reassessment of levels at which sole source determinations were approved, direction to acquisition review activities to include noncompetitive contracts as items of special review interest and a review of competition

---

13 Deputy Secretary of Defense, Memorandum for Secretary of the Army, Secretary of the Navy, Secretary of the Air Force, Director, Defense Logistics Agency, SUBJECT: Need to Increase Competition in Defense Acquisitions, 21 June 1979.

14 The Secretary of the Army, Memorandum for the Deputy Secretary of Defense, SUBJECT: Need to Increase Competition in Defense Acquisitions, July 1979.

MAJOR SOLE SOURCE CONTRACTS*

AS A PERCENTAGE OF TOTAL DARCOM

PROCUREMENT DOLLARS (TOP 25 SYSTEMS)

FISCAL YEARS 75-80

	75	76	77	78	79	80
Total DARCOM Procurement Dollars (in millions)	4,564	4,506	6,268	7,602	8,708	9,433
DARCOM Top 25 Systems Sole Source Dollars (in millions)	1,189	1,348	1,845	2,087	3,418	4,145
% of Total DARCOM Dollars to Top 25 Systems - Sole Source	26.1%	29.9%	29.4%	27.5%	39.3%	43.9%

Above information excludes FMS and Intragovernmental

*Source: Army DD Form 350, Individual Procurement Action Report, Files - DARCOM HQMIS

TABLE 3. IMPACT OF MAJOR SOLE SOURCE CONTRACTS

instruction in training courses. (The FY 81 statistics may indicate that the initiatives are beginning to exert an impact.) A significant part of the Army response was devoted to a discussion of Army studies addressing competition. The Army Procurement Research Office has previously performed other competition studies primarily directed towards the determination of the savings which could be expected from competition.[15] This guide is a natural follow-on to the previous efforts.

E. CURRENT EMPHASIS ON COMPETITION.

1. Competition is a major thrust of the DOD Acquisition Improvement Program.[16] "Increase competition in the acquisition process" is one of the 32 initiatives included in the program.[17] In addition to the general direction from DOD for the services to establish appropriate program objectives to enhance competition, the Under Secretary of Defense for

---

15 F. T. Lovett and M. G. Norton, Determining and Forecasting Savings from Competing Previously Sole Source/Noncompetitive Contracts, APRO 709-3, Army Procurement Research Office, Fort Lee, VA, October 1978; R. C. Brannon et al., Forecasting Savings from Repetitive Competition with Multiple Awards, APRO 807, Army Procurement Research Office, Fort Lee, Va, November 1979; C. H. Smith, The Effect of Production Rate on Weapon System Cost, Research Paper P-2, Army Procurement Research Office, Fort Lee, Va, November 1980; C. H. Smith and C. M. Lowe, Jr., Sole Source and Competitive Price Trends in Spare Parts Acquisition, Research Paper P-5, Army Procurement Research Office, Fort Lee, VA, April 1981.

16 Frank C. Carlucci, Deputy Secretary of Defense, Memorandum for Secretaries of the Military Departments, SUBJECT: Improving the Acquisition Process, 30 April 1981.

17 Frank C. Carlucci, Deputy Secretary of Defense, Memorandum for Secretaries of the Military Departments, SUBJECT: Increasing Competition in the Acquisition Process, 27 July 1981.

Research and Engineering specifically directed the services to:[18]

a. Designate advocates for competition at each procuring activity who are responsible for insuring that competition opportunities are not lost.

b. Establish realistic but challenging competition goals.

c. Insure that each commander with a procurement function under his responsibility understands his responsibility for maximum feasible competition.

d. Make competition in systems development and production a matter of special emphasis.

e. Develop procedures for identifying significant achievements in competing contractual requirements.

DOD has also endorsed component breakout as a competition technique which should receive more attention.[19] Breakout is discussed in more detail in Chapter III, Section I, of the report. In essence the DOD Memorandum calls for greater participation by Small Business Specialists and Representatives in making the breakout decision. The dual objectives of the memorandum are to increase competition and to increase small business participation in Defense procurement.

---

[18] The Under Secretary of Defense for Research and Engineering, Memorandum for Secretaries of Military Departments, SUBJECT: Increasing Competition in the Acquisition Process, 10 November 1981.

[19] The Under Secretary of Defense for Research and Engineering, Memorandum for Assistant Secretary of the Army (RDA), SUBJECT: DOD Spare Parts Breakout Program, 1 October 1981.

2. Army implementation of the DOD initiative is contained in Army Acquisition Letter (AL) 82-2.[20] In the letter the Department of the Army requires each Head of Contracting Activity (HCA) to take the following actions:

a. Appoint an individual, board or committee to act as a Special Advocate for Competition. ADARS (Army DAR Supplement) 1-401 has been changed to incorporate this requirement.

b. Submit quarterly reports to DA which address progress toward implementation of plans to increase competition and status of goals achievement.

c. Assign an individual at headquarters level as point of contact for competition matters.

d. Identify significant achievements in competing contractual requirements and forward with quarterly reports.

---

[20] Department of the Army, Office of the Assistant Secretary, Acquisition Letter (AL) 82-2, Increasing Competition in the Acquisition Process, 11 January 1982.

CHAPTER III

COMPETITION METHODS

A. INTRODUCTION.

This chapter is devoted to a detailed discussion of the specific methods or techniques currently used to enhance competition. The information about the methods has been derived from regulations, research studies, and a review of programs where the methods have been applied.

It may seem premature to discuss the methods prior to considering the factors which influence competition (Chapter IV). The rationale for presenting the topics in this order is that an appreciation of the methods should lead to a better understanding of the interrelationships between the methods and the general conditions which either favor or constrain competition. This becomes apparent in the discussion of "Feasibility of Competition" in Chapter IV. Actually, an acquisition planner must consider the topics jointly in formulating a competition strategy for a system. Neither can be treated in a vacuum.

The methods presented in the following paragraphs are a mixture of techniques. The F^3 and TDP descriptions are traditional methods of engendering competition for end items. The theory is that if the two descriptions are clear, complete and accurate and do not contain restrictive provisions, then, ceteris paribus, competition should naturally follow. Leader/follower procurement, the educational buy, directed licensing, and contractor teaming are techniques intended specifically to create second sources. Component breakout applies to competing subsystems and repair parts. It is analogous to the TDP and F^3 methods except that the traditional methods apply to

major equipment while breakout is appropriate at the component level. Multiyear procurement does not seem to fit this set. In fact, it can be used in conjunction with the other techniques. However, it is included in this chapter because it is a contracting tool that is frequently pinpointed as an effective means of encouraging competition.

Finally, the competition methods which are presented are not intended to be exhaustive. Rather, they represent the techniques which are most frequently used. Acquisition activities are encouraged to explore other ways of introducing competition on Army programs. No doubt there are innovative and unique solutions to the competition problem which have not yet surfaced.

B. TECHNICAL DATA PACKAGE (TDP).

1. Definition.

The TDP is defined as a technical description of an item adequate for use in procurement. This description defines the required design configuration and assures adequacy of item performance. It consists of all applicable technical data such as plans, drawings, and associated lists, specifications, standards, models, performance requirements, quality assurance provisions and packaging data.[21] The TDP may range from a single line in a contract to several hundred or thousands of pages of documents. The TDP is predominantly a design description which has evolved out of the R&D cycle and is intended for use in the production of the item. A qualified second source should be able to use the TDP in manufacturing an almost identical copy of the item made by the developer. In a very real sense the TDP is the primary product of R&D. The progression of the TDP is described by a number of DOD documents dealing with specifications and drawings.

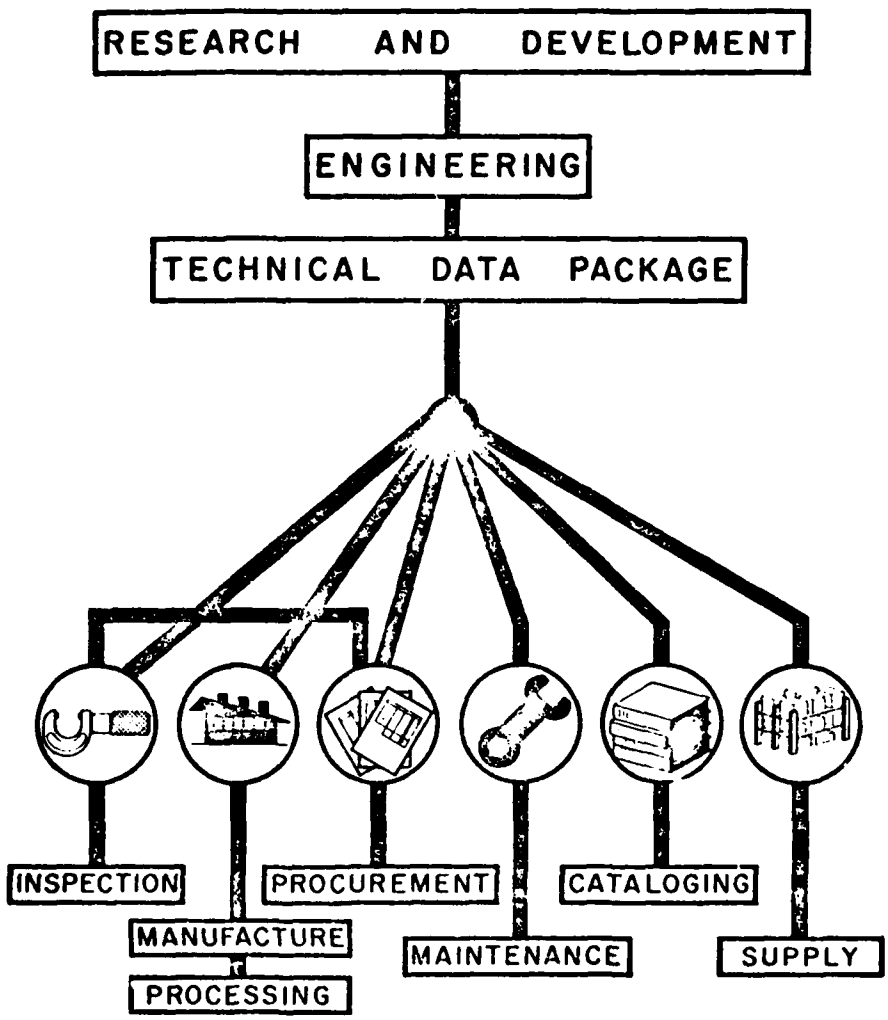
2. Analysis of the Definition.

A detailed look at the definition reveals that a TDP bridges across functional lines (Figure 2). Note the words "procurement," "configuration," "drawings," "specifications," "standards," "quality assurance," and "packaging." Why is this significant--because it explains the absence of a universal understanding of the term. Definition depends on your point of view. To engineering personnel a TDP is an engineering description. To quality assurance it is primarily an inspection standard. To procurement

---

[21] DARCOM Regulation 70-46, Technical Data Package for Procurement and Production of AMC Materiel, 28 May 1970.

TECHNICAL DATA PACKAGE USAGE



"Production Engineering Standard Practice Manual"
U.S. Army Engineer Research and Development Laboratories.

FIGURE 2. TECHNICAL DATA PACKAGE USAGE

it is a contractual instrument. No one is wrong. A TDP is all these things. The purpose of this discussion is to reach a degree of common understanding of the term to gain an increased appreciation for the use of a TDP in supporting competition. It is essential that program management, contracting, engineering, and others agree on when a TDP is ready for competitive procurement.

3. Validated TDP.

a. General.

Definition alone is not sufficient for determining when a TDP is ready for competitive procurement. Criteria must be established by which the competitive status of the TDP can be judged. The term most frequently used to describe a TDP ready for competitive procurement is a "validated TDP." Other phrases used also include "mature TDP" and "proven TDP." Included in this paragraph is a description of criteria which have been used to evaluate TDP status. They are primarily used in conjunction with systems acquisitions which are making the transition from development into production. However, the criteria can be used selectively to judge the status of any TDP.

A word of caution needs to be inserted. The criteria are intended to assist the decision-maker in evaluating the status of a TDP. They do not guarantee that the technical package is satisfactory for competitive procurement. TDP competitive suitability is a subjective determination which must be performed on a case-by-case basis.

Finally, TDP validation and configuration control are closely related. On contracts for major systems production competition will rarely occur prior to Government assumption of formal configuration control.

b. Criteria for a Validated TDP (Figure 3).[22]

(1) Successful completion of development testing. This may be accomplishment of Development/Operational Tests II (DT/OT II). Or, if limited production of the system is planned, the evaluation of the DT/OT III results may be the appropriate criterion. DT/OT II occurs during full scale development. The purpose of DT II is to insure that the engineering is reasonably complete, all significant design problems have been identified, solutions to the problems are in hand, and critical issues have been resolved. The DT II test concerned with validation is the Prototype Qualification Test - Government (PQT-G) performed by the Government. The purpose of OT II is to demonstrate that operational performance of the system meets operational performance requirements. DT/OT III, if performed, takes place during the production phase on limited production quantities. The purpose is, for all practical purposes, to assure that the production item is the same as the development prototype which met DT/OT II. This assures that the transition from development to production is successful. The DT III validation test is the Production Validation Test - Government (PVT-G). A first article initial production test (FA-IPR) can be used to accomplish the same purpose on full production contracts. In effect, all these tests are used to prove the TDP and the hardware.

(2) Completion of functional and physical configuration audits (FCA and PCA). FCA and PCA are prescribed configuration management activities. The FCA is conducted in the latter stages of full scale development. The audit is a review of test results on the development prototype to determine that the system will perform as intended and that development has

---

22 Information on Validated TDP was primarily derived from a proposed policy statement of the Procurement and Production Directorate, US Army Missile Command, 14 Nov 1980.

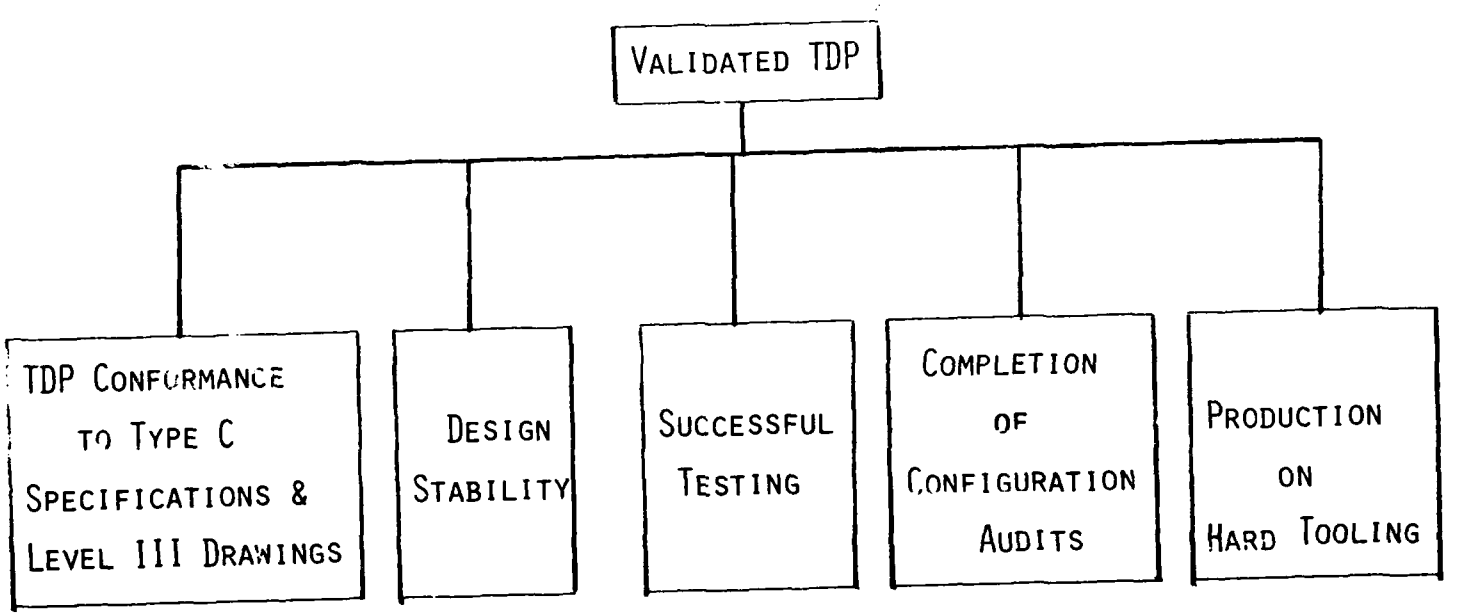


FIGURE 3. PROPOSED CRITERIA FOR A VALIDATED TDP

been satisfactorily completed. The PCA involves the matching of the TDP with the development prototype. Its purpose is to insure that the data package accurately describes the hardware which has been built and tested.

(3) Determination that hardware design is relatively stable. The criteria above are indicators of design stability. Additionally, design stability can be correlated with engineering change proposal (ECP) activity. A minimum of engineering changes emanating from either the contractor or the Government during the latter stages of R&D or early production is evidence that the TDP is satisfactory for competitive procurement.

(4) Production of a sufficient quantity of systems on production hard tooling. Stated another way, acceptable systems have been produced to the TDP on an assembly line or production rate basis. This is ultimate proof that the TDP has made the successful transition from development to production. It must be recognized that items manufactured prior to this time may be "hand built" prototypes and not representative of those manufactured on a production contract.

(5) TDP conformance to Type C specification requirements of MIL-STD-490 and Level 3 drawing requirements of DOD-D-1000B. (See below.)

c. Specifications and Drawings.

Most of the TDP is composed of specifications and drawings. Therefore, it is useful to examine specification and drawing practices within DOD and the Army. A uniform system for the preparation of specifications and standards is prescribed by DOD documents.

(1) Specifications. MIL-STD-490, Specification Practices, establishes the format and contents of program (system) specifications.

In other words the standard covers the preparation of narrative descriptions of technical requirements for systems which do not fall into the Federal or Military series of specifications. The contents of program specifications and Fed/MIL specifications are similar because the format is the same. MIL-STD-490 is a key document in the DOD configuration management (CM) program. Both the standard and the CM directives refer to the same baselines and baseline identifications--functional configuration identification, allocated configuration identification, and product configuration identification. In the framework of this discussion, technical descriptions, system specifications and configuration identifications are synonymous. Most specifications included in TDP's will adhere to the requirements established in MIL-STD-490. Therefore, in describing acceptable specifications for inclusion in TDP's for competitive procurement, the terms in MIL-STD-490 will be used. Type C Product Specifications are of primary interest because by definition they are the specifications which are used in production contracts for a prime item. Implicitly Type C specifications should be sufficiently descriptive to allow competition for the prime item. Of course, other supervening circumstances such as non-availability of additional sources or substantial initial investment by the developer may dictate continuing into production with the developer as a sole source. Of special significance to contracting personnel is Type C1b, prime item product fabrication specification which is for all intents and purposes the TDP. This type constitutes a detailed design disclosure package. It is needed when control of the interchangeability of lower level components and parts is required and when maintenance and training are

significant factors. The detailed description of the parts and assemblies are described by DOD-D-1000 (see below).

MIL-S-83490, Specifications, Types and Forms, describes requirements for program peculiar specifications prepared under contract. Two types of specifications covered are the same as those included in MIL-STD-490. MIL-STD-490 goes into far more detail on format and contents.

MIL-STD-961, Outline of Forms and Instructions for the Preparation of Specifications and Associated Documents. This standard provides guidance for the preparation of Military and Federal specifications. The contents and format of specifications prescribed in all three standards are essentially the same. Primary differences relate to numbering and designations, differences that are of no special significance in this study.

(2) Drawings. As mentioned previously, a Type C1b specification includes detailed drawings in addition to the narrative statements associated with specifications. Like specifications the format and contents of drawings to be included in TDP's are prescribed in DOD standards.

DOD-D-1000B - Drawings, Engineering and Associated Lists. This document prescribes the general requirements for drawings and associated lists. Its greatest value is in defining different levels of drawings which provide a natural progression of a design from inception of the system to production. Level 3 drawings intended for production of the items are of primary importance. The intended use of Level 3 drawings is to provide engineering data for support of quantity production of the end product and to permit competitive procurement for items substantially identical to original items.

DOD-STD-100C - Engineering Drawing Practices. This standard prescribes the detailed procedures and format for preparation and revision of engineering drawings and associated lists. The requirements of DOD-STD-100C apply to Level 3 drawings.

4. TDP Risks on Initial Production Contracts.

On the initial production contract for Army hardware, the TDP may not have been validated according to the validation criteria. Risks are inherent in using an unproven TDP for the first time in production. The TDP may not accurately describe a system which can be mass produced--resulting in the production of inferior equipment, delays in delivery, and increased costs due to frequent engineering changes. To counter these adverse effects the Army may rely on contractual provisions to shift some of the risks to the contractor. Two examples follow:

a. System Responsibility. The Government makes it clear that the system performance requirements must take precedence over design specifications and drawings during production. Engineering changes not affecting the performance specifications will be implemented at no cost to the Government. Other changes are closely controlled by the Government. Finally, the prime contractor will be responsible for system integration of Government furnished material (warheads, fuzes, engines, etc.).

b. Preproduction Evaluation (PPE). On an initial production contract the Army frequently supplements the TDP with a Preproduction Evaluation clause. The PPE clause requires each of the prospective contractors to conduct a review of the TDP and to certify its suitability for use in complying with end item performance requirements. The prospective

contractor includes the TDP review price as a separate part of his bid price. During contract performance the successful contractor, as a result of the PPE clause, has agreed to correct errors in the TDP at no cost to the Government. In essence the PPE clause is used when there is doubt regarding the status of the TDP. The TDP must still substantially comply with the criteria for a validated TDP, especially with regard to the requirements for Type C specifications and Level 3 drawings. But realistically it still may contain errors and there is the possibility that a source other than the developer will be awarded the initial production contract. Additional information on the PPE concept can be found in DARCOM Pamphlet 715-6, Preproduction Evaluation (PPE) Contract.

5. Implications for Usage.

The TDP method is the one most often used in the acquisition of military equipment. A validated TDP is the most complete technical description which exists for military hardware. It has the advantage of promoting competition in Defense procurement and supporting the aims of the DOD with respect to standardization and interchangeability. There is a high probability that the validated TDP is an accurate description of hardware which meets the needs of the user. But the TDP is no panacea. It is very difficult to prepare a document of such technical detail without omitting some essential feature. Additionally, the manufacture of complex equipment usually entails more than documented instructions. "Know-how" is an intangible related to the production of an item which cannot be put down on paper. The TDP may also include proprietary features which may complicate the acquisition. In instances where the TDP cannot stand alone as a

competitive instrument, other methods may be called upon to supplement the description. Leader/follower may assure the successful transfer of technology in the event of "know-how" problems. Licensing can be used to counter the legal complications of proprietary data.

In conclusion, it is almost impossible to conduct a competitive procurement without a complete and accurate TDP. There are instances, of course, in which the F^3 description is appropriate as pointed out in the next paragraph. But in most acquisitions of major systems, the F^3 description will not apply. Acquisition personnel should constantly remind all personnel with TDP responsibilities of the important contractual role of the TDP.

C. FORM, FIT, AND FUNCTION (F^3).

1. General.

The Form, Fit and Function (F^3) method is the description of military equipment by performance characteristics. The equipment is described in terms of output, function and operation. External configuration, mounting provisions or interface requirements may be included. But details of design, fabrication and internal structure are normally left to the option of the contractor. F^3 is the classic "black box" concept where it is not necessary to define the internal workings of the products. The method is also referred to as the "freedom of design" alternative. It stands to reason that performance specifications generally will enhance competition since few, if any, restrictions are placed on how the item will be made. In fact, in the commercial world the average consumer buys not only to a price, but according to his performance desires. Gasoline consumption ratings have become the major characteristic for automobile purchases. Air conditioners are bought to BTU specifications. Washers are selected on the basis of load capacities and special performance features.

2. Advantages and Disadvantages of F^3.

The advantages and disadvantages of buying to performance specifications can to some degree be inferred from the definition and above description. The list is not complete; rather, it highlights some of the principal advantages and disadvantages. Also, the advantages and disadvantages are relative; they are compared to design specifications.

a. Advantages.

(1) Increased competition can be expected. Since a variety of technical approaches may result in a product giving the desired function, it is certainly probable that more potential sources are available. It is also likely that the increased competition will mean lower prices.

(2) The F^3 description encourages innovation and ingenuity. Private industry is not constrained by Government designs. Contractors are given extensive design latitude and are expected to provide new approaches and concepts.

(3) The responsibility for meeting performance is placed squarely upon the contractor. Responsibility for adequate design is vested in the contractor. The Government is able to get out from under the doctrine of implied warranty which is associated with design descriptions. The doctrine states that "if the [design] specifications are followed, a satisfactory product will result."[23] In other words, the burden of performance is upon the Government if the contractor adheres to the design requirements.

(4) The problem of procuring or maintaining a Technical Data Package is removed from the Government. Technical data is expensive; configuration control is troublesome and costly.

b. Disadvantages.

(1) The overriding disadvantage of the F^3 description relates to logistic implications. The likelihood is that, over time, a number of different items will be purchased, all of which conform to the functional

---

[23] United States v. Spearin, 248 US 132 (1918).

description. Yet they will not be alike internally. Standardization and interchangeability will be adversely affected. The number of repair parts for stockage will increase. Operational and maintenance training will be required for each item of equipment. The problems are magnified for maintenance and supply personnel in field units who are required to support equipment under already less than ideal conditions.

(2) It is alleged that the performance specification is more apt to encourage the marginal producer to bid low than a design package. The low bidder may not appreciate the engineering effort required to meet stringent performance requirements. To counter this threat the Government must place greater reliance on source selection criteria. The criteria must be carefully constructed to include the means to evaluate contractor awareness of critical elements as well as the capability to produce the item.

(3) Performance specifications place more emphasis upon testing. Qualification (first article) testing will be essential since one may be dealing with an unproven design. Initially, the added requirement for testing may not appear to be a disadvantage. However, it must be remembered that structuring tests requires creativity. In addition, it is possible that test equipment must be built. Finally, the tests may be time-consuming and costly, factors which may be overlooked in a superficial analysis of the proper method to be used.

3. Implications for Usage.

Normally, F^3 specifications are best used for the acquisition of expendable, nonreparable items where systems performance is not dependent upon internal configuration of components. Commercial

off-the-shelf and modified commercial items especially meet this definition. Even in circumstances where the items are reparable, the F^3 description can be expected to be applicable for commercial items because responsibility for repair and stockage of parts can remain with the supplier. Typewriters and ADP equipment are examples of such equipment.

On occasion military characteristic items meet the criteria for the F^3 method. Ammunition for the GAU-8A gun system of the Air Force was procured from a second source by this method.[24] The prime contractor for the gun system was directed by the DSARC (Defense Systems Acquisition Review Committee) to develop a second source both for mobilization and enhancement of competition. The logic was sound. Although the ammunition was not the major item, it accounted for much of the life cycle cost for the system. The GAU-8 ammunition met the F^3 conditions well. Primary emphasis was placed on ammunition performance. While controls on the external configuration were required to assure that the ammunition could be used in either of two guns, control of internal configuration was unnecessary. The details of the acquisition will not be covered here, but the GAU-8 ammunication procurement has been identified as an innovative and successful program. It is suggested that the GAU-8 Program Office be contacted if further information is desired. However, one significant feature of the procurement deserves special mention. Both the original producer and the second contractor were required to have capacity for a defined peak year production. Because of the high tooling costs involved,

---

[24] Sellers, p. 114; Dennis S. Parry, Second Sourcing in the Acquisition of Major Weapon Systems, Naval Post-graduate School, Monterey, CA, June 1979, p. 40.

both initially refused to comply. The project office overcame the resistance with the use of a special termination clause entitled "Cost Recovery for Contractor Facilities Investment." This clause essentially states that if tne contract is terminated, the Government will assume the cost of the unamortized value of the extra capital equipment. While controversy surrounded the use of the clause, it was finally determined that its use did not violate the Anti-Deficiency Act.[25] Capital investment is closely related to the competition issue as seen in this example and Chapter IV. For further information refer to an APRO study on capital investment incentives.[26]

Largely as a result of the GAU-8 success, the Multiple Launch Rocket System (MLRS) project office was directed by the Defense Acquisition Review Council (DSARC) to consider the "freedom of design" approach in its Second Source Rocket Acquisition Study.[27] The study team did include an in-depth analysis of the "freedom of design" approach along with other alternatives addressed in this study. They noted a number of differences which reduced the utility of the alternative. The DSARC had suggested that the loser in the validation phase might be a potential second source because the Government could take advantage of the loser's development experience. The study team pointed out that the technical approach of the loser was

---

25 31 U.S.C.A., para. 665.

26 Wayne V. Zabel and Duane D. Knittle, Improving Productivity and Reducing Cost Through Capital Investment Incentives, APRO 80-07, Army Procurement Research Office, Fort Lee, VA, December 1980.

27 MLRS Second Source Rocket Acquisition Study, System Planning and Evaluation Division, US Army Missile Command, Redstone Arsenal, AL, December 1980.

unproven and the loser's rocket would require redesign because it was dimensionally larger than the winner's rocket. Further, ballistic algorithms are affected which would necessitate modification to the fire control system. In essence, the differences would result in major redesign of the system and require extensive testing. The purpose of this discussion is not to condemn F^3 as a competition alternative. Rather, it is to show that it cannot be simplistically stated that an alternative should be applied because it was successful on a similar program. Individual circumstances and complexities of each acquisition must be reflected in a competition analysis.

Although F^3 specifications are more appropriate for nonreparable items, they are also used for totally different types of military equipment; e.g., generators and military construction equipment. Generally, systems in this category are quasi-commercial with a mix of military and commercial characteristics. Because Government TDP of the design type is not imposed, more competition is achieved and industry retooling is not required. On the other hand, field maintenance support of the equipment in this category can be a special problem as described in the F^3 disadvantages. The difficulties--repair part support and maintenance training--can possibly be alleviated through the use of special contractual arrangements. These include warranty provisions, renewable maintenance contract provisions, and service contracts which require the equipment manufacturer to support the equipment throughout its operating life.

In conclusion, there are distinct advantages of purchasing by the F^3 method. Yet, as with any other method, there are also shortcomings. The pros and cons of going with the method must be thoroughly evaluated before a final decision is made.

D. LEADER/FOLLOWER (L/F).

1. Definition.

The leader/follower (L/F) method is an acquisition technique under which the developer or other producer of an item or system (the leader company) furnishes manufacturing assistance and know-how or otherwise enables a follower company to become a source of supply for the item or system (DAR 4-701). A paraphrase of the DAR definition would be as follows: leader/follower is a contractual arrangement in which a leader provides data and assistance to help a follower become a qualified producer of an item. Implicit in this definition is the fact that the leader is the developer and sole producer of the item and the follower has demonstrated the capability to produce the item.

2. Procedures.

Three procedures (Figure 4) are available for implementing the L/F technique (DAR 4-703).[28]

a. Award of a prime contract for supplies to an established source (leader) who is obligated to subcontract a part of the quantity to a specified or competitively selected subcontractor (follower). The leader is also required to furnish technical assistance to the subcontractor in producing the subcontracted quantity.

b. Award of a prime contract for a part of the total requirements for supplies to the leader company. In turn, the prime contract also obligates the leader company to provide technical assistance to the follower who has a direct contract with the Government for the remaining portion of the total requirements.

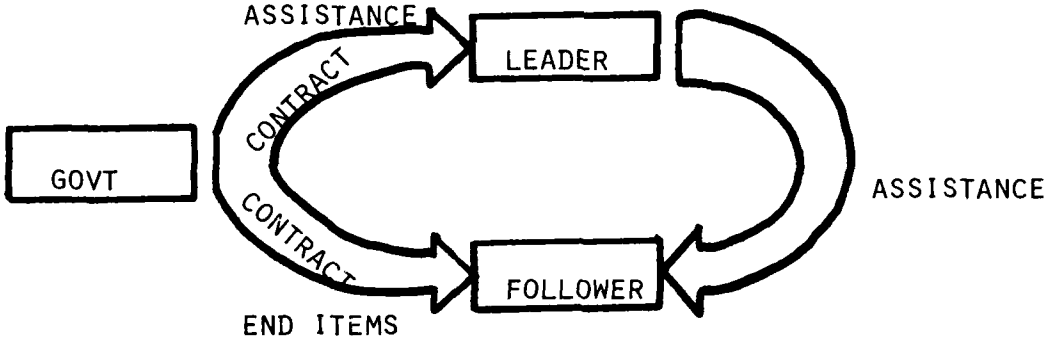
---

28 John A. Muller, Competitive Missile Procurement, Fifth Annual Department of Defense Procurement Research Symposium, 17-19 Nov 76, Naval Postgraduate School, Monterey, CA, pp. 98-112.

LEADER COMPANY PROCUREMENT MODELS (DAR 4-703)

I DAR 4-703 (a)

II DAR 4-703 (b)



III DAR 4-703 (c)

FIGURE 4. LEADER/FOLLOWER MODELS

c. Award of a prime contract for the total quantity of supplies to the follower company. The prime contract obligates the follower company to subcontract for technical assistance with the leader company.

3. Objectives of L/F.[29]

There are two primary reasons for creating second sources to produce military hardware--broadening the industrial base and achievement of cost savings.

a. Broadening the Industrial Base.

Reliance on a single source to manufacture defense items can have an adverse impact on delivery schedules. The source may be unable to meet the existing requirements because of limited capacity within its plant. Use of L/F allows the Government to generate additional capacity, assuring continued delivery of the critical items. In this case the intent is to continue with dual production by both sources. A similar reason for broadening the industrial base is to develop a capability for producing the item under mobilization conditions. A second source is available in the event of a national emergency. Note that in both these cases cost reduction is not the foremost driver. Rather the purpose is to assure that the military receives on time the quantity of equipment needed to accomplish the mission. Negotiation exception 16 (10 U.S.C. 2304(a)(16)), Purchases in the Interest of National Defense or Industrial Mobilization, justifies using the L/F technique to broaden the industrial base.

---

29 Charles W. N. Thompson and Albert H. Rubenstein, The Leader/Follower Concept in Acquisition, International Applied Science and Technology Associates, Inc. (IASTA), Evanston, IL, 15 November 1979, p. ii.

b. Achievement of Cost Savings.

A second major objective of L/F contracting is to create competition in order to lower or hold the line on prices paid for the items. The focus of L/F in this study is application of the technique to enhance competition.

4. Planning for L/F.

Early planning for L/F not only facilitates later use but also provides lead time to industry for its planning. Reaching an L/F agreement in principle with the developer during the R&D phase is recommended.[30] The agreement provides leverage and motivation with the eventual leader. It makes it clear to all parties early in the acquisition that production competition is anticipated. The contractors cannot at a later time accuse the Government of breaching faith or changing the rules.

Early planning can also uncover potential bottlenecks. Perhaps significant facilitization costs are envisioned, necessitating the inclusion of costs for tooling and facilities in the budget. Proprietary rights may be an issue requiring consideration of a licensing agreement. Potential subcontractor bottlenecks may be revealed. Decisions pertaining to change control and engineering responsibilities can be addressed.

Another point needs to be made concerning L/F planning that is implicit in the above discussion. In most cases it takes additional money to create competition. Yet in these days of tight budgets, it has been difficult to defend budget entries specifically earmarked for competition.

---

[30] Deputy Secretary of Defense, Decision Memorandum on XM-1 Tank, 8 May 1979.

In more than one instance line items devoted exclusively to competition planning have been deleted from the budgets for weapons systems. It would appear that higher echelons are not convinced of the potential benefits of competition on specific programs. Perhaps more credible justification is the answer. A detailed competition study which includes the cost benefits of competition may be sufficient to convince the budget makers of the efficacy of the plan.

5. L/F and the Technical Data Package.

a. The L/F method is closely akin to the Technical Data Package method of achieving competition. The L/F method presupposes the existence of a TDP adequate for competition. Whether or not a validated TDP is a prerequisite is subject to debate. Delaying competition until the TDP is validated may effectively prohibit obtaining realistic competition due to an insufficient quantity of items remaining to be produced. Using a TDP which is not validated may mean technical problems resulting in schedule slippages, increased engineering changes, and concomitant increases in costs. Certainly a validated TDP is desirable, but a production TDP which has evolved from R&D may be sufficient. The leader company is expected to bridge the gap between the initial production TDP and the validated TDP. The leader complements the TDP with its knowledge of system production.

b. Generally, L/F is used in conjunction with the TDP in the following circumstances.

(1) A system of moderate complexity has evolved from research and development.

(2) The transfer of technology cannot be accomplished through the TDP alone; technical assistance is required in order to provide the manufacturing "know-how" essential to the successful production of the hardware.

(3) The system is essentially new with production only by the developer of the system.

c. The advantages ascribed to L/F as opposed to using the TDP alone are:[31]

(1) A higher assurance of successful technology transfer.

(2) Accomplishing production qualification at an earlier date thereby increasing the opportunity for competition.

(3) Ability to assign reliability and warranty responsibility.

6. Industry Surveys.

Industry willingness to participate as followers in a L/F acquisition is obviously essential to success. In many instances project management personnel or acquisition managers may be able to make this determination through its knowledge of the firms with which it does business. On the other hand it may be necessary to conduct physical surveys to gather information on selected potential bidders. The survey should lead to a detailed analysis of the following:

a. The desire of specific firms to participate as followers.

b. The determination of open capacity available for producing the system or component.

---

[31] MLRS Second Source Rocket Acquisition Study, U.S. Army Missile Command, Redstone Arsenal, AL 35898, December 1980, pp. 30.

c. Special tooling and equipment required to support quantity production.

d. Acquisition lead times to obtain tooling and equipment.

e. Costs associated with getting ready to participate as follower.

7. Implementation of L/F in the Army.

a. Applications of L/F in the Army have resulted in significant cost savings.[32] Real competition was generated; the follower became a viable competitor of the leader. An examination of these successful programs noted the following essential characteristics.[33]

(1) First year production of the system by the developer-leader, during which time the TDP is validated.

(2) Concurrent with the release of the first production equipment, a competition among established producers for selection of a second source.

(3) Award of an educational buy (see next paragraph) with option provisions to the follower to enable him to become proficient in manufacturing the hardware.

(4) Follower production of a small quantity of items for qualification testing, with technical assistance furnished by the leader.

(5) Exercise of option by the Government so that follower can demonstrate his capability to achieve quantity production. (Unless the leader has the capability to produce quantities needed by the Government, leader/follower will not accomplish the purpose for which it is intended--

---

[32] Lovett and Norton, pp. 17-33.

[33] Leader/Follower Briefings, Procurement and Production Directorate, US Army Missile Command, Redstone Arsenal, AL. (Undated)

competition in the full production phase.)

(6) Split buy award between leader and follower to build up production capability of follower.

(7) Buy-out, winner take all competition, for full production quantities.

b. These historical acquisitions were conducted under relatively ideal conditions--stable budgets, large quantities, and short acquisition leadtimes. Today's conditions are different. To use L/F successfully, steps will have to be taken to compress the schedule. Acquisition decision makers will need to be innovative, finding shortcuts without taking undue risks.

8. Analysis of the Procedures.[34]

A review of recent L/F procurements disclosed that all were either (i) one contract with the prime as the leader and the subcontractor as the follower; or (ii) two contracts and two primes, the leader and the follower. (See Figure 4.) Under both alternatives the leader was required to provide technical assistance, and selection of the follower was generally competitive with the Government playing a major role in the follower decision.

a. Advantages and Disadvantages of Model I.

Responsibility for successful technology transfer and successful production by the second source is vested in the prime contractor. He has not successfully performed the contract until the subcontractor has become a successful producer. Leader motivation is highest with this option. Also, one contract is required for production of quantities

---

[34] Leader/Follower Briefings, MICOM, and Memoranda for Record (MFR's), Acquisition Study Group.

and furnishing of technical assistance. Government involvement and administrative costs are considerably reduced. On the other hand the option essentially diminishes the role of the Government. Yet Government control and direct access to both companies may be essential for the resolution of technical and contractual conflicts.

b. Advantages and Disadvantages of Model II.

Proponents of Model II feel that Government control is essential in this unique contractual technique. Frequent interaction will be required among the leader, follower and the Government. It is only with this option, state the supporters, that the Government can assure that the technology will be successfully transferred. Critics maintain that the method removes the responsibility for follower deliveries from the leader. The leader, who cannot be expected to be an advocate for a technique which is unfavorable to him, will not in all probability be motivated to make the procedure work without a specific responsibility provision. A second criticism is that the Government must administer two or possibly three contracts as opposed to one with the first option. There is a contract with the leader for production quantities, a contract with the follower for production quantities, and conceivably a third contract for engineering services. (The technical support agreement for engineering services may be included in the leader's production contract.) Extra contracts mean additional Government expenses for administration.

E. EDUCATIONAL BUY.

1. Definition.

An educational buy is a contract to provide a firm the opportunity to learn how to manufacture limited production quantities of a military item of equipment in accordance with a Government TDP. Normally, the purpose of the method is to generate a competitive second source for an item which has previously been bought noncompetitively. The second source contractor is usually selected as a result of competition, although the source can be directed by the government. The DAR does not recognize the educational buy as a distinct method of competition. Yet it is frequently addressed by Army personnel who plan acquisition strategies. Also, the educational buy has been used successfully on a number of occasions.[35] In most instances the method has been used in conjunction with leader/follower. The difference between the methods is that L/F requires the sole source to furnish technical assistance through an engineering services contract. Implicit in the use of the educational buy without L/F is that the TDP stands alone and that the second source needs little or no help from the developer/sole source to learn how to make the item. Both leader/follower and the educational buy require that the items manufactured by the second source pass the qualification tests.

2. Advantages of the Educational Buy.

a. The educational buy can be an excellent method of enhancing competition.

---

35 Lovett and Norton, pp. 17-33.

b. It is likely to be much less costly to implement than L/F, licensing or teaming.

3. Disadvantages of the Educational Buy.

a. The use of the method to develop a second source is time-consuming. A realistic schedule must be provided to allow the second source time to learn how to produce the item, time for a gradual production rate build-up, and time to permit valid testing.

b. Its use may be limited, e.g., it may not be feasible to use the method by itself for second sourcing complex items.

F. DIRECTED LICENSING.

1. Definition.

The directed licensing method is akin to leader/follower in that the leader provides data and assistance to help a follower become a qualified producer. However, with licensing, not only is assistance provided but the developer (who may be the leader or subcontractor of the leader) is selling or renting something he owns (patents, trade secrets, etc.).

The directed licensing method consists of the use of a special provision (1) as part of a contract between the Government and developer or sole producer of an item or system, or (2) as a separate agreement between the developer or sole producer and another potential producer whereby the developer or sole producer agrees to grant authoritative permission to another source for the production of the item or system.[36] Rand who has performed most of the research in licensing has coined the following definition. "The directed licensing concept consists essentially of having the Government obtain from a weapon system developer, at the time of issuance of the development contract, a contractual commitment for rights to production data and an agreement to license whomever the Government designates to produce the weapon system during any or all production runs, following initial production by the developer. The developer would agree to provide a data package and such technical assistance as may be required to get the new contractor into production. The development contractor would be compensated for his efforts by fees and royalties agreed upon at the time of

---

[36] DAR Case 79-42, Competition in the Production Phase (Draft).

initial commitment."[37] As with other second sourcing methods the objectives of licensing are twofold, expanding the production base and enhancing price competition.

2. Applicability of Directed Licensing.

Directed Licensing has limited applicability for major systems in the Army. Licensing is primarily applicable when the technical data[38] or patents were generated by the developer or sole source at his own expense and the rights to that data clearly belong to the developer/contractor. Most major systems in the Army have evolved through a Government-financed R&D cycle. Hence, the Government owns the TDP and the need to license the system does not exist. But it should be recognized that a system is made up of many parts. These parts, major subsystems or components, may have been developed with private funds. Subsystem or component licensing thus becomes a distinct possibility and appears to offer the greatest hope as a viable competition alternative within the Army.

3. Licensing Agreements.

A license agreement with a well defined set of terms and conditions is essential to the success of the licensing method. This is especially true when you are dealing with a reluctant licensor. There are many reasons why a licensor would be reluctant; the prime reason is probably his loss of monopolistic control. Normally, the Government will not be a party to licensing agreements involving domestic companies. However, the

---

37 Gregory A. Carter, Directed Licensing: An Evaluation of a Proposed Technique for Reducing the Procurement Cost of Aircraft, Rand R-1604-PR, Dec 74.

38 Technical data is defined as recorded information, regardless of form or characteristic of a scientific or technical nature.

Government should provide guidance in specific terms of what should be included in the agreement. They should also retain review and approval authority. The following lessons were principally derived from Army experiences on NATO programs involving US and European industry.[39] Naturally, there are differences between national and international licenses. For example, language nuances play a much more significant role in the negotiation of international licenses. Nevertheless, there are many features of licensing agreements which are equally applicable to both situations.

a. Establish the effective date and the duration of the agreement. The length of the agreement period affects contract costs and administrative costs associated with royalties.

b. Agree to a comprehensive definition of the system being licensed. Refer to a dated specification if possible. Include all ancillary equipment, support equipment, test units, tooling, training equipment and repair parts, as well as subsystems and subassemblies.

c. Make sure licensor has all rights from subcontractor. Guard against situations where an essential subsystem is proprietary to a manufacturer who is not a party to the licensing agreement.

d. Make the licensor responsible for furnishing all applicable technical data. Include a complete description of the technical data to be furnished--parts lists, material specifications, drawings of components, tools, jigs, and gauges; operating sheets; inspection information; and any other pertinent data. Describe the form and format of the data to be

---

39 W. Williams, V. Perry, and H. Candy, NATO Standardization and Interoperability Handbook of Lessons Learned, Army Procurement Research Office, Fort Lee, VA, December 1978, pp. 73-82.

delivered. Establish a schedule for the delivery of the data. Attempt to include a penalty provision for late delivery, e.g., a reduction of the royalty.

e. Describe the technical assistance to be furnished by the licensor. Come to an understanding regarding the meaning of "know how."

f. Define the royalty base. The sales price is often used for royalty computation. This price should reflect the fair market value of items made by the licensee. The royalty is usually expressed as a percentage of the selling price. The most frequently observed percentage is 5 to 5-1/2%. In the present inflationary environment it may be best to negotiate a royalty based upon a fixed amount per unit rather than a percentage of future selling prices to keep royalty fees from escalating. Avoid high nonrecurring or front-end royalties. Front-end costs are very sensitive and will leave a negative impression on higher headquarters and Congress.

g. Cover explicitly the protection of proprietary data. Of special importance are the limits on disclosure of data.

h. Provide coverage on the obligations of the licensor and licensee with respect to improvements and engineering changes. Establish that the licensor will retain design responsibility for the hardware.

4. Critique of Licensing.

a. Major Systems.

Licensing of the production of major systems has been infrequent in the Department of Defense. Further, none of the agreements have been entered into with the primary objective of reducing the production price of the hardware. An early example within the Army was the M-16 rifle licensing agreement in 1967 between Colt and the Army which gave the Army the right

to contract for the establishment of additional sources. Included in the agreement was (1) a substantial cash payment to Colt, (2) a royalty of 5-1/2 percent of the selling price on all weapons and repair parts sold to the Government by sources other than Colt, (3) and a minimum quantity per month which would be purchased from Colt. The primary purpose of buying the data rights from Colt was to broaden the production base for the weapon. A secondary reason was to control prices through competition. Due to an increased demand for the rifles in the late 60's both second and third production sources were selected. The premium prices paid for the rifles procured from the additional sources prompted a Congressional investigation.[40] Because the issues related to the controversy are only indirectly related to this study, they will not be discussed here. The Congressional report did make an observation about the M-16 and proprietary rights that does have relevance to competition. The report criticized the Army for not acquiring the data rights 3 years before the actual purchase of the data. The terms offered by Colt at the earlier time were much more favorable. The Army's position was that they could not envision the large demand for the M-16's which were required to make the terms cost effective. Had they known the requirements they would have certainly entered into the earlier agreement. The message is clear. Once the Army has made a decision that a specific system designed at private expense is essential to its needs, it should actively negotiate for the purchase of the data rights. A more favorable

---

40 Hearings before the Special M-16 Subcommittee on the Preparedness Investigating Subcommittee of the Armed Services Committee June 19 and 20, 1967.

agreement is probable because the Army still has the option of pursuing an alternative course of action, e.g., F^3 descriptions. (See the Cruise Missile example below.)

More recent examples of licensing in the Army were the Roland missile and the M-240 (MAG-58) machine gun.[41] Both systems were developed with European technology and required licenses between European companies and US Government and industry. In neither case was price competition the reason for the licensing agreement. Rather the systems were bought because existing Army needs could best be satisfied by European systems and NATO standardization was enhanced. Air Force examples analyzed by Rand were contracts in which US firms entered into overseas licensed production of US designed military aircraft.[42] The problems are different than those involving licensing in a domestic environment. The licensors realized that the overseas sources were not competitive threats for US production. Also, the licensor recognized that licensing agreements were necessary to get the overseas business.

As this brief overview of licensing of major systems suggests licensing principles and their application to price competition have not evolved due to DOD's limited experience with the method. It is difficult to provide guidelines to assist those responsible for developing acquisition strategies. Certainly, it is possible to recommend what should be covered in a licensing agreement. But circumstances which favor licensing cannot

---

41 Williams.

42 Carter.

be well-defined. The limited experience is indicative of another conclusion. There are few opportunities for licensing at the major system level. After all, most systems are developed at DOD expense. Proprietary rights should not be a major issue except perhaps at the subsystem or component level.

b. Subsystem or Component Licensing.

Licensing opportunities are more apparent at the subsystem or component level. It is here that you can expect to find the mechanical and electrical items which have been developed at private expense. American ingenuity is often more evident at this level. Also, licensing is fairly common for these unique items. Small entrepeneurs are frequently responsible for technological breakthroughs resulting in patents. Because the components may have wide application and, hence, may be needed in substantial quantities, the small firms may decide it is in their best interests to license other producers. The terms of these agreements are for the most part routinely negotiated in the commercial world.

An interesting example of subsystem licensing occurred on the Air Launched Cruise Missile Program.[43] The engine, a major subsystem, was proprietary. The Air Force determined that a second source was essential to assure that the projected requirements for the system could be met. The engine developer resisted Air Force efforts to have them enter into a second source licensing agreement. The Air Force then proposed to go out for a new engine development using a F^3 description. Faced with the prospect of a totally different engine, the engine developer relented and consented to

---

43 Sellers, p. 118.

the licensing of its engine. Although the developer recommended the second source, approval of the source was the responsibility of the Air Force. Optimism has been expressed by the project office that downstream cost savings on the program will be achieved through the competition which is being generated.

Another interesting aspect of subsystem licensing, from which we should learn, also involved Cruise Missile engines. The developer claimed 100% of the parts as proprietary data developed at private expense. Due to urgent time constraints, the Government had not been able to verify the developer's claim prior to signing the license agreement. After several years of investigation and legal interpretation, the developer now claims proprietary rights to only six parts which represent less than 1% of the total parts; however, the originally negotiated royalty fee remains unchanged because of the wording of the original agreement.[44] This example illustrates the important role of predetermination of rights in data[45] prior to the negotiation of the licensing agreement.

5. Implications for Usage.

Although licensing appears to have limited application in the Army, the proprietary data issue does arise from time to time. When this occurs, the reaction can be traumatic. Litigation and program stoppages can result.

Prior licensing agreements can alleviate the situation. Project officers should consider including licensing provisions in the development

---

44 George Francis Sparks, Direct Licensing in Major Weapon Systems Acquisition, Master's Thesis, Naval Postgraduate School, Sep 80, p. 74.

45 DAR 9-202.2(d).

contract when possible problems with proprietary data are envisioned at either the system or subsystem level. The provision should (i) permit the Government to select a licensee, (ii) permit the developer or sole source to select a licensee, or (iii) permit the developer or sole source to select a licensee subject to Government approval. Thus, the provision assures that the potential for production competition is maintained throughout the acquisition cycle. This threat of competition exerts pressure upon the sole source to hold his prices down. Prior licensing agreements also have additional advantages. They minimize the problem of litigation and place the responsibility for technology transfer upon the developer/sole producer. Finally, the Cruise Missile office estimated that licensing would result in large cost and time savings over the F^3 method, which is the most likely alternative for competing a system having significant proprietary data.[46] While the savings projections must be tempered by the knowledge that the estimates were provided by the licensor, it is reasonable to conclude that licensing would save R&D costs and test qualification time.

Recognize, however, that licensing does have disadvantages. The royalty and technical assistance fees may increase licensor costs to a point where the potential for competition is minimal. Also, it is inherently difficult to motivate a sole source contractor to create competition for himself. A climate of cooperation must exist in the licensing environment, a climate that is difficult to foster.

---

[46] Sparks, p. 70.

G. CONTRACTOR TEAM ARRANGEMENTS.

1. Definition.

Contractor team arrangements are described in Section 4-117 of the DAR. The DAR recognizes two distinctly different types of teaming:

a. The prime contractor arrangement where two or more companies form a partnership or joint venture to act as a potential prime contractor.

b. The prime-subcontractor arrangement where a potential prime contractor agrees with one or more other companies to act as his subcontractor(s) under a specific Government acquisition.

2. Applicability.

Teaming allows team members to complement the unique capabilities of each and to offer the Government the best combination of capabilities to achieve the system performance, cost and delivery desired for the system being procured. In the DOD the method has been applied in the following circumstances:

a. Research and Development (R&D). Teaming has been primarily associated with research and development contracts where the combined expertise of two or more companies has been necessary to design and engineer products to meet complex military requirements.

b. Production contracts. The DAR acknowledges, almost as an afterthought, that teaming might be appropriate for other situations, including production contracts. The primary emphasis of this study is the application of teaming on production contracts for the purpose of enhancing competition and providing multiple sources. Realistically, it is hard to envision a case in which production teaming is not preceded by R&D teaming. System complexity gave birth to contractor teaming on

defense contracts. And it is during the R&D phase that the complexity problems are resolved and technical learning takes place, both of which are prerequisites for successful production. The example of the Airborne Self-Protection Jammer competition which is covered later in this section illustrates both R&D and production teaming on the same program.

c. A final application of teaming in DOD was noted on international programs where technology was transferred from European to US concerns. On the Roland missile program Hughes and Boeing collaborated to produce the US Roland under a license agreement with Euromissile, a French/German consortium. Under the terms of the license the technology was transferred to the Hughes/Boeing team in the U.S. The team has exclusive rights for production of the U.S. Army's requirements as well as some production for foreign sales. Not only did teaming on the Roland take advantage of the unique talents of the team members, it also provided for sharing of the costs and risks on a difficult technology transfer program.

3. Policy.

DOD policy as expressed in DAR 4-117 is to recognize the integrity and validity of contractor team arrangements, provided the relationships are identified and stated in the proposal to the Government. The Government normally will not require or encourage dissolution of contractor teams. In order to discourage the potential abuses of teaming DOD policy does not authorize arrangements which violate anti-trust statutes nor does the policy limit the Government's rights to:

a. Approve subcontracts in accordance with DAR requirements;

b. Determine the responsibility of a prime contractor on the basis of the stated team arrangement;

c. Provide the selected prime contractor with data rights owned or controlled by the Government;

d. Pursue its policies on competitive procurement, subcontracting and component breakout, after initial production procurement or at any other time.[47]

4. Recent Legal Developments Pertaining to Teaming.

In light of the increased attention being devoted to teaming as an acquisition method, it is appropriate to review recent decisions of the Courts and Comptroller General related to the validity of the teaming concept. The primary purpose of this discussion is to assess the potential impact of these rulings on future Government business.

a. Comptroller General.

A recent Comptroller General (CG) decision pertaining to a DAR 4-117 protest makes several points relevant to teaming and competition.[48] The primary issues were the timeliness of the protest and the alleged violation of a teaming agreement by the Government. Even though the CG ruled that the protest of the award was untimely, he nevertheless dwelt in some detail with the allegations that the Government had acted improperly. Energy Research Corporation (ERC) protested an award to United Technologies Corporation (UTC) for design, fabrication, test and delivery of sixteen silent power fuel cells with power conditioners. Delta Electronic Control Corporation (Delta) had previously developed a power conditioner for the silent fuel cell. ERC sought out Delta and entered into an agreement in

---

47 DAR, Section 4-117(b).

48 Comptroller General of the United States, Decision B-197697, Washington, DC, 13 August 1980.

connection with ERC's proposal for the contract which was under protest. If ERC was awarded the contract, the parties would negotiate in good faith for a subcontract to Delta. The agreement prohibited each party from divulging confidential or proprietary information of the other. It provided that the parties could pursue "their own independent programs; programs with other private parties; other programs with DOD or other Government or other funding agencies such programs including the design and/or development of both fuel cells and inverters alone, apparatus directly associated with fuel cells and systems incorporating fuel cells." Subsequently, Delta also agreed to furnish the power conditioner to UTC should UTC be awarded the contract. UTC was ERC's only competitor for the fuel cell contract. UTC won the competition and ERC protested on the grounds the Army had violated DAR 4-117 by not honoring the agreement between ERC and Delta.

With respect to the alleged violation of DAR 4-117, the Comptroller General upheld the Army. While the agreement provided for cooperation between ERC and Delta, it did not specifically prohibit Delta from quoting to other private parties. It only prevented Delta from revealing ERC's confidential or proprietary information. A quotation did not violate this condition. Also, the agreement did not guarantee a subcontract to Delta in the event that ERC won the award, only that the parties would negotiate in good faith. The teaming agreement wa to terminate upon acceptance or rejection of ERC's proposal, except with respect to protecting confidential or proprietary information. At that time, Delta was free to contract with UTC. Therefore, stated the Comptroller General the agreement between ERC and Delta was not exclusive and the Army had not violated DAR 4-117.

b. Court Decisions.

Two decisions upheld the validity of oral teaming agreements.[49] In both cases the Courts held, despite the lack of written teaming agreements, that the course of conduct of the parties in each case indicated that valid agreements did exist. Interestingly, a third case[50] addressed the issue of reduction of competition through teaming, a potential abuse addressed earlier. While the decision rendered in this case may be reversed, the Court's decision bears close study in any treatment of teaming and competition. Northrop and McDonnell Douglas entered into a teaming agreement to develop a lightweight fighter for both Air Force and the Navy. Northrop was to be the prime on any land based fighter for the Air Force and McDonnell Douglas was to be the prime for any carrier based fighter for the Navy. In addition, the two companies agreed to a similar allocation for foreign sales of aircraft. Subsequently, General Dynamics won the Air Force competition for the fighter and McDonnell Douglas won the Navy competition. Even though Northrop had lost the Air Force competition, it continued to try to sell its planes to friendly nations. Subsequently, McDonnell Douglas attempted to sell its planes in some of the same foreign markets. Northrop sued McDonnell Douglas on the grounds that the teaming agreement was breached. In analyzing the anti-trust issue the Court used the terms vertical and horizontal relationships. The distinction is that two companies dealing with each vertically are normally prime contractor and subcontractor. The

---

49 Air Technology v General Electric Company, 347 Mass 613 (1964); Experimental Engineering, Inc. v United Technology Corporation, 614 Fed Rptr 2d, 1244.

50 Northrop Corporation v McDonnell Douglas Corporation, D. Ct. Cal, CV 79-4145-R, September 5, 1980.

subcontractor furnishes hardware to the prime and, as a result, is not a natural competitor. A horizontal relationship indicates that two companies produce similar goods and are natural competitors. In the Northrop-McDonnell Douglas decision the District Court reasoned that the two firms were horizontal competitors. The court stated that the teaming arrangement was "an illegal allocation of markets" and was unenforceable. To reiterate the case is under appeal and may be overturned.[51]

The preceding decisions point out the need for DOD to insist upon documented enforceable agreements to clarify all relationships and responsibilities of firms wishing to participate on defense procurements. The agreement should address the effective dates of the agreement, allocation of tasks, data responsibilities, rights and patents, handling of proprietary information, and a host of other important activities. A well-written agreement should result in a reduction in controversy and litigation involving teaming.

5. Teaming and Production Competition.

An example of an innovative acquisition strategy which includes the use of teaming agreements to enhance competition is the Airborne Self-Protection Jammer (ASPJ). The ASPJ is an electronic countermeasure (ECM) package which is being developed to protect tactical aircraft of the Navy and Air Force against current and foreseen radar guided munitions. It is a high cost, high technology DOD program managed by the Navy.

Because of the complexity of the system and the high production

---

[51] J. Dennis Heipt, "Teaming Agreements in a Government Contracting Environment," Contract Management, June 1981, National Contract Management Association, McLean, VA.

rate envisioned, the Navy Project Office proposed the teaming concept for full scale development and initial production of the system.[52] See Figure 5. Several companies entered into teaming agreements (joint ventures) and competed during the early phases of the ASPJ program. The two teams eventually selected for Phase I, which was called Design Development and Risk Reduction, were ITT/Westinghouse and Sanders/Northrop. During this phase both teams were required to formulate proposed designs. In addition breadboard models of critical components were fabricated and demonstrated in order to identify the program areas of high technical risk. At the conclusion of Phase I the models were evaluated; a critical design review of the teams' paper proposals for the Phase II was conducted; and one team (ITT/Westinghouse) was chosen for the Phase II contract. The technical approaches and designs of the competing Phase I breadboard prototypes were similar in terms of quality and performance. The "state of the art" was such that no technological breakthroughs occurred. Therefore, price was the primary factor in the selection of the winning team.

Phase II will consist of Fabrication, Assembly, and Test of the total system and engineering for production. The engineering for production requires that each team member independently demonstrate the capability to manufacture the ASPJ in the production environment.

At the conclusion of Phase II each team member will receive a contract for a portion of the first production run. The quantity split each will receive will be based on price and other factors. The split award assures that two sources have the demonstrated ability to produce

---

[52] Government Contracts Service, "Acquisition Strategy Developed to Insure Competition on ASPJ Program," Number 17-80, Procurement Associates, Inc., Covina, CA 91724, pp. A-7 to A-9.

COMPETITIVE TEAMING

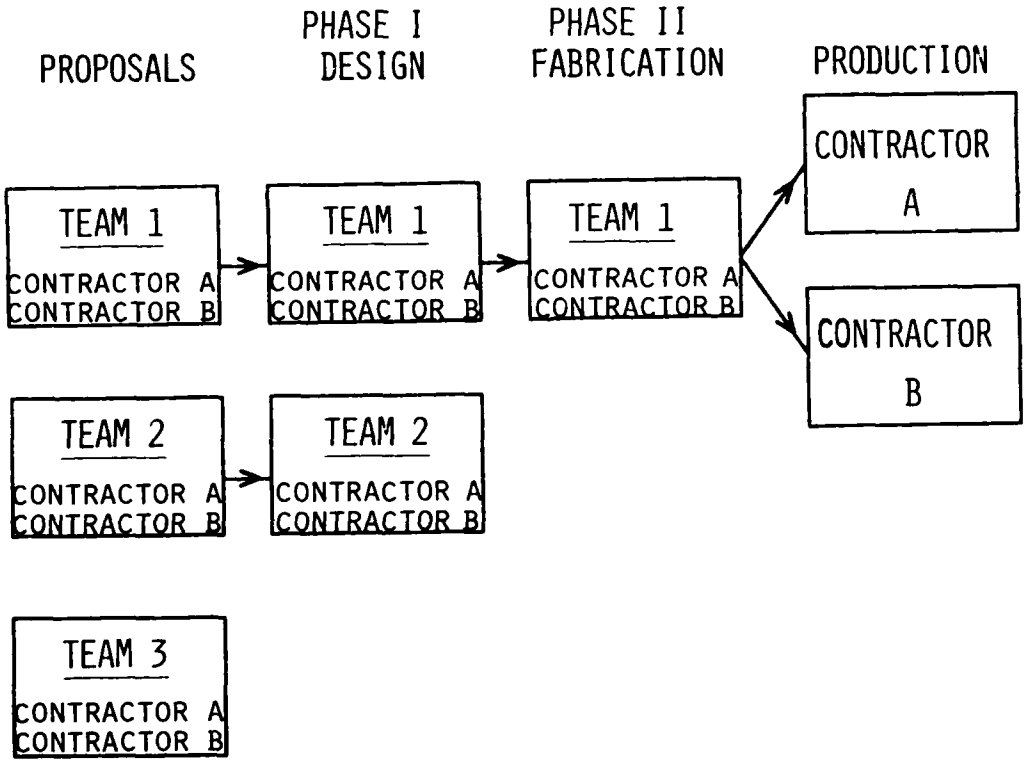


FIGURE 5. TEAMING AND PRODUCTION COMPETITION

production quantities. On the second production run it is anticipated that the two team members will compete against each other for the remaining total production quantity.

The Project Manager feels that teaming on this program will prevent "buying-in" and will emphasize costs to insure that price competition is meaningful and will influence production acquisition costs.[53] The PM's optimism was confirmed by the most recent Design to Cost projections which showed a Design to Cost decrease of 30%. It should be noted that cost credibility has been a vital part of the program since the beginning.[54]

It is too soon, of course, to evaluate the effectiveness of the ASPJ approach. Certainly it shows the type of ingenuity and creativeness that can lead to improvements in the way DOD buys. But the special nature of the acquisition must be recognized. First, it is a joint program that will result in a jammer that could be used on five or more major tactical aircraft systems of the Navy and Air Force during the years 1985 and beyond. The Office of the Secretary of Defense has made it clear that the ASPJ is the ECM airborne system of the future. The total program is potentially valued at 1 to 3 billion dollars. One of the team members has said that the magnitude of the joint program convinced them to participate. It was the only game in town. Had the program been sponsored by a

---

53 Richard Heroux, Joint Venture, A Technique for Second Sourcing, extracted from a paper entitled Competitive Teaming, Naval Air Systems Command, 1979.

54 Interviews with ASPJ Program Manager and Business Manager, Mar 82.

single service they would not have consented to play the role of team member.[55] A Navy study raised a fundamental question which will influence the degree to which the method will be applied to future DOD acquisitions.[56] Skeptics question whether or not two historical adversaries will fully exchange the information and technology necessary to enable both to establish independent production lines capable of producing the total system. Will the ASPJ program encounter such problems with the teams as management coordination, proprietary data and process considerations, division of labor, and other parochial concerns. Whether or not the incentives for cooperation are sufficient to overshadow the self interests of the individual firms remains to be determined. But the Project Officer maintains that the problems mentioned above have not materialized to this point in the program.

6. Summary.

A useful way of summarizing teaming as a technique to enhance production competition is to list the criteria for usage and the advantages and disadvantages of the teaming technique. These have been synthesized from the experiences of the ASPJ project office and the findings of the Navy studies.

a. Criteria for Usage.

(1) Moderate to high level complexity. In the context in

---

55 Government Contracts Service, "Acquisition Strategy Developed to Insure Competition on ASPJ Program," Number 17-80, Procurement Associates, Inc., Covina, CA 91724, pp. A-7 to A-9.

56 Sellers, p. 122.

which teaming is discussed in the DAR system complexity underlies its application. It is assumed that the development of major defense systems might from time to time be beyond the design capabilities of a single industrial concern. In such circumstances drawing together the technical talents of two or more companies in some form of legal teaming arrangement is a feasible way of assuring the Government's requirements can be met.

(2) Parity of subsystems. Major systems are composed of subsystems. Teaming, as a competition technique, requires near equality among team members. Therefore, if one subsystem and hence one team member is dominant, it would appear unlikely that the lesser team member would ever be in a position to seriously compete during the production. The ASPJ is composed of several black boxes, all of nearly equal complexity. In this connection, it can also be concluded that the prime-subcontractor teaming arrangement is not preferred on those teaming programs where production competition is envisioned between team members. The joint venture or partnership arrangement is recommended.

(3) Program stability and large production quantity. As with any major competition scheme, high volume and stability are essential. It is even more imperative, when two or more major firms are being asked to commit themselves for both the R&D and production phases of the program.

(4) Dollar range where competition can be expected to result in significant benefits. This primarily applies to unit costs of each system to be produced rather than total program costs. When unit costs are high, it can be expected that there will be greater opportunities for efficiencies and economies through competition.

(5) Expectation that each team member will have the capability

of producing the entire system at the conclusion of R&D. This means that each has the facilities and technical and managerial talents to manufacture the system without the assistance of the other team member.

b. Advantages of Teaming.

(1) Price competition throughout the life of the program. Price is emphasized during each contract proposal evaluation throughout the R&D and production phases. Of particular value is the assurance of competition earlier in the production cycle.

(2) Acceleration of combat readiness. The availability of two sources from the outset of production insures higher production rates and faster deliveries.

(3) Full design data disclosure. Team members are required to share technology; hence no information concerning proprietary processes or techniques can be withheld from team members of the Government. There is, in effect, a cost free sharing of technology and no need to procure a full unlimited technical data package.

(4) Enlargement of the industrial base. The erosion of the defense industrial base is frequently cited as a major problem of the U.S. economy. Teaming results in the creation of at least two sources fully capable of independently manufacturing the total system.

(5) Enhancement of design competition. Smaller contractors who do not have the in-house capabilities to compete independently on major acquisitions may compete through teaming arrangements.

H. ASSOCIATE CONTRACTOR STRUCTURE.

1. Introduction.

Although it has been sparingly used within the DOD, the associate contractor structure offers potential for enhancing competition on major acquisitions. Under the concept two or more prime contractors develop or produce different subsystems or major components of a weapon system. This differs appreciably from the normal relationship that exists in weapon system development and production where there is one prime contractor and one or more major subcontractors (Figure 6). Associate contractors are not to be confused with competitive validation where two prime contractors are competing system concepts against each other. Nor is the structure to be confused with teaming which results in either a prime-subcontractor relationship or a legal agreement between two entities in the form of a joint venture or partnership.

Two versions of the associate contractor arrangement were observed in the DOD. Because of the significant differences between the two, they will be discussed separately in the following paragraphs.

2. Air Force.[57]

a. The Air Force version of the associate contractor structure used on the ICBM Program has as its distinguishing characteristic the use of many relatively small contracts with an array of associate prime contractors (Figure 7). Missing from this structure is a single large prime contractor with integrating responsibilities for the entire weapon system. Under such an acquisition strategy the Government has responsibility

---

57 Willian F. Moore, The Associate Contractor Strategy for Systems Acquisition, National Defense University, Washington, DC, August 1979.

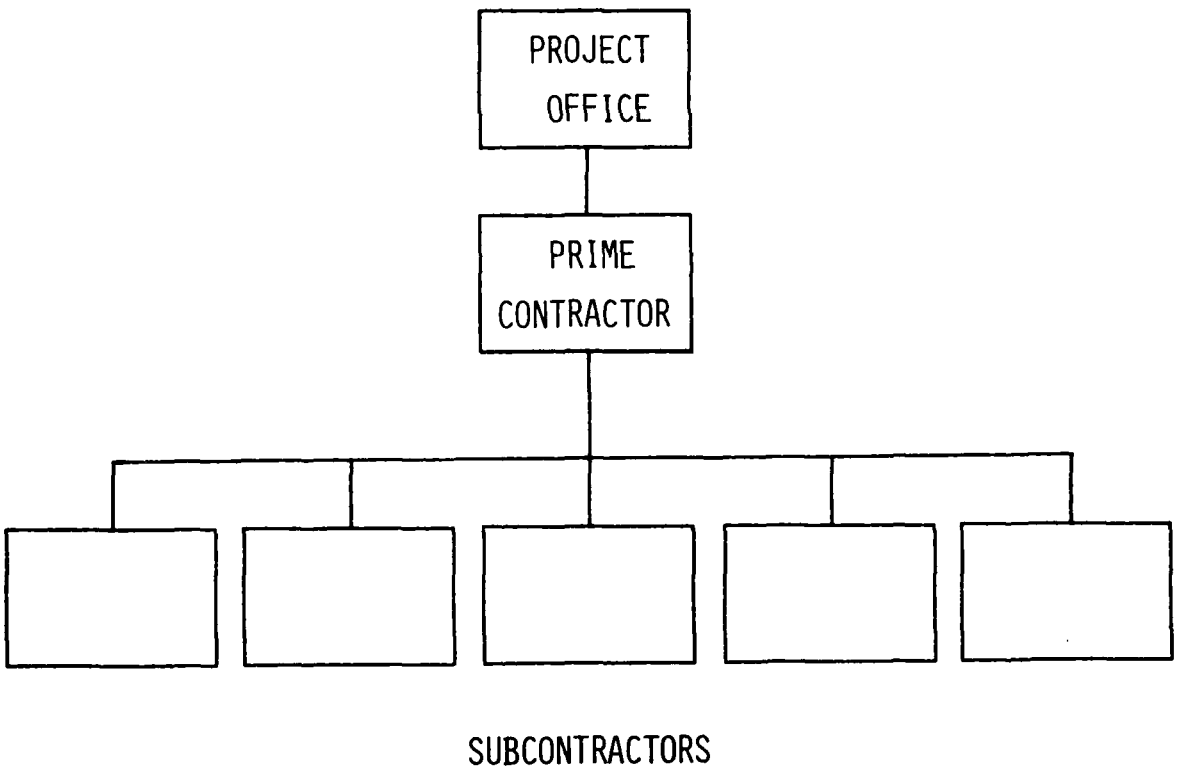


FIGURE 6. NORMAL CONTRACT RELATIONSHIP ON MAJOR DOD ACQUISITIONS

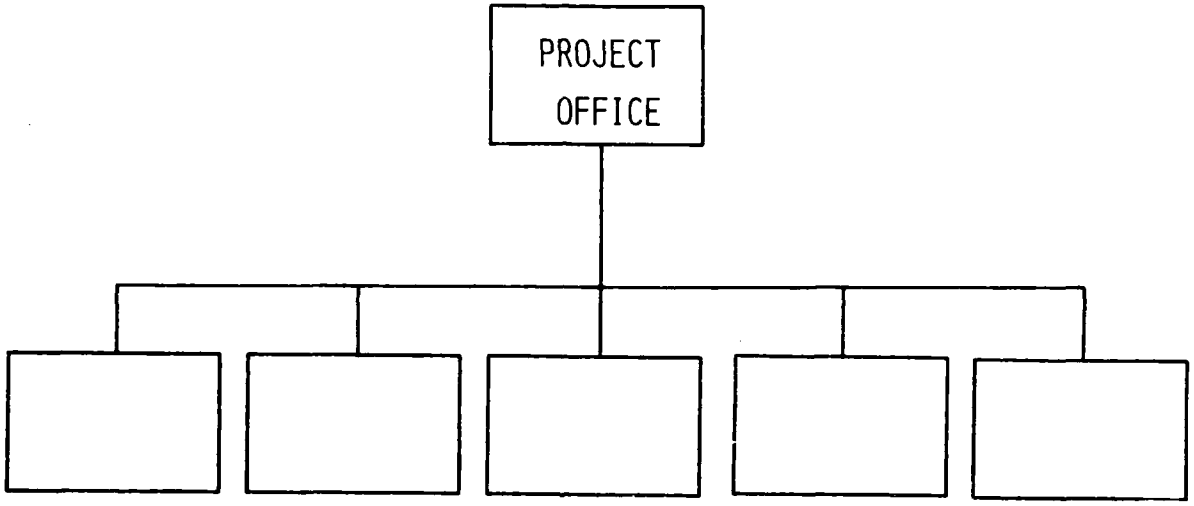


FIGURE 7. ASSOCIATE CONTRACTOR STRUCTURE (AIR FORCE)

for integrating the subsystems or components furnished by the associate contractor into a functional major system. The Government may choose to contract out integration tasks such as assembly, test and system support with still another associate price contractor. The integrating contractor would have system oriented duties, a major one being early identification and elimination of interface and integration difficulties. Even under these circumstances ultimate responsibility for the total weapon system must remain with the Government because of the absence of contractual agreements between the associates.

b. Advantages of Air Force Method.

(1) The Government can select the most appropriate type of contract for each major subsystem or component. This is important because each subsystem may be characterized by totally different technical and cost factors. Cost reimbursement contracts may be appropriate for an advanced guidance system while a fixed price contract may be best for a low risk propulsion stage similar to one previously produced. It is also possible to tailor individually and independently incentive provisions for cost, performance and schedule.

(2) The Government has the prerogative to choose the subsystems that define the associate contractor structure. The technique allows the Government to make the choice on the basis of system tradeoffs, contractor capabilities, and risk factors. A prime contractor may make his selection solely on the basis of profitability.

(3) The structure requires the development of a strong Government managerial and technical team. In-house expertise is particularly valuable at a later date when modification programs are anticipated. The Government can deal directly with the former associate contractors rather than going through a single prime contractor.

(4) There is more effective control of contractor performance. Because of broader and more direct Government involvement with the companies performing the work, cost and manpower performance reports are more timely, relevant, and accurate. Potential problems are noted earlier and can be eliminated more efficiently.

(5) The method avoids the payment of "fee on fee." In the prime-subcontractor arrangement for development and production of a major system, the prime contractor is paid for managing subcontractors and assuming the responsibility for integration of subsystems. This surcharge is eliminated with associate contractors.

(6) The associate contractor structure enhances competition. With the associate strategy, the production of subsystems may be independently competed on the basis of price. Breaking out the major system into its component parts opens up the competition to a greater number of potential sources. Small contractors who are unable to assume the financial risk of a large program may be able to compete actively for at least one of the major subsystems. During the development phase technical competition also may be enhanced. The associate method allows the opportunity to compete subsystem prototypes for the purpose of reducing risks and lowering costs.

c. Disadvantages of the Associate Contractor Structure.

(1) The relationship is more complex and management intensive. Additional contracts impose added burdens of administration and management

on Government personnel. Assumption of the responsibility for systems integration brings with it the need for greater skills. Day to day specification control and interface management are among the systems management activities that demand unique talents not normally possessed by Government employees. Of course, PM offices are staffed with personnel who are knowledgeable in these areas. But their usual roles are planning and monitoring rather than directing and actively managing.

(2) Systems responsibility must be assumed by the Government. Traditionally, DOD policy has been that system responsibility should be vested in the prime contractor who designs and develops the system. This policy has been implemented through system responsibility provisions in contracts.[58] Without systems integration responsibilities contractors cannot be held accountable for the proper operation of the total system. Certainly associate contractors are obligated to deliver subsystems that conform to the Government's requirements. But they do not have ultimate responsibility for total system compatibility and performance.

3. Army.[59]

a. The Army version of the associate contractor structure is used on the contract for the Roland missile. The associate contractor relationship on the Roland missile program includes two prime contractors--Hughes and Boeing (Figure 8). Responsibility for delivery of the hardware to the Government is assigned by separate contracts to both associates. Hughes delivers the missile, Boeing the fire unit. Each prime contract

---

58 Frederick W. Helwig and William B. Williams, Evaluation of the System Responsibility Concept, APRO 506 (Draft), Army Procurement Research Office, Fort Lee, VA, February 1975.

59 Information provided by Roy Hall, Roland Project Office, March 1982.

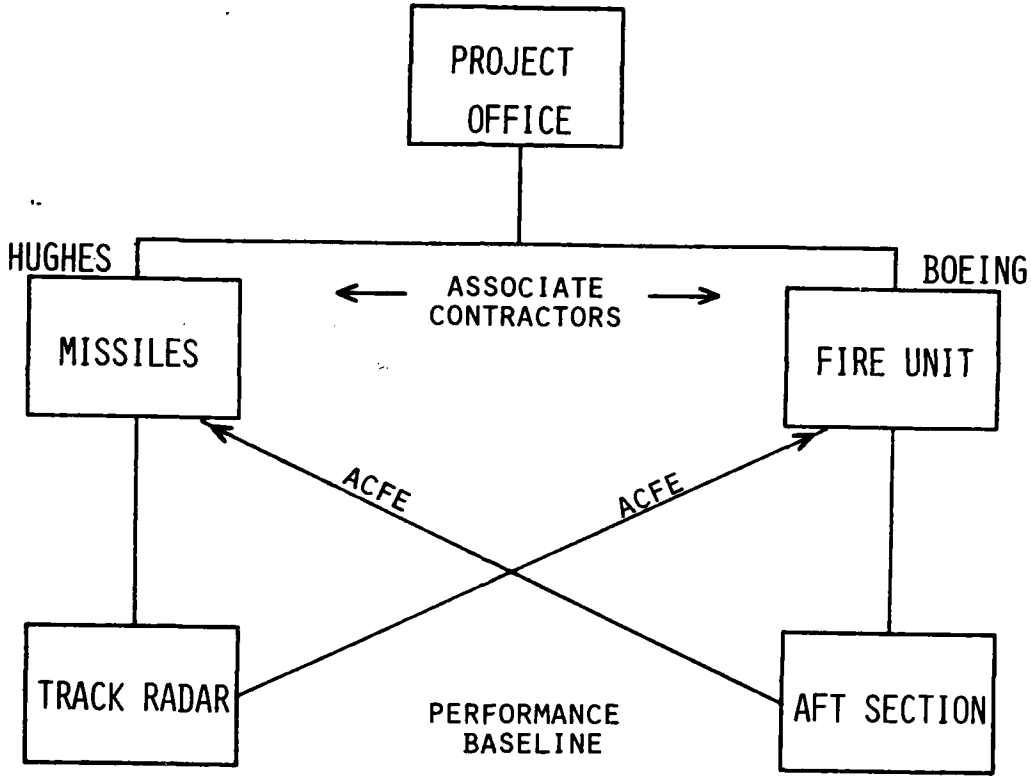


FIGURE 8. ASSOCIATE CONTRACTOR STRUCTURE (ARMY)

requires direct delivery to the Government of respective end items (subsystems) fully capable of integration and in the proper configuration to demonstrate that the overall system performance requirements have been achieved. Each associate expressly recognizes that the fulfullment of the obligations stated in each contract is consistent with the undertaking of the other associate to assure that the Government is provided a system capable of meeting system performance requirements.

Integration of subsystems between associates is the responsibility of both associates. Each has the responsibility of insuring that the interrelated activities undertaken between them do not conflict with the contract requirements each associate has with the Government. If the subsystems do not meet system performance requirements and the associates fail to agree on where corrections should be made, Hughes has been given the authority to allocate responsibility for the correction. The allocation decision does not form the basis for claims against the Government by either associate. In other words allocation for correction of nonperforming hardware is the responsibility of the associates according to the agreement between them.

A unique feature of the Roland contract is the contractual method of transferring and integrating the hardware produced by each associate. It is a matter of reciprocal responsibility since each associate manufactures equipment which the other must incorporate into the subsystem it produces. As stated previously Hughes provides the missile and Boeing the fire unit. Hughes also produces the track radar which is a major component of the fire unit and is furnished to Boeing. On the other hand Boeing produces the aft section of the missile which is incorporated into

the missile and must be furnished to Hughes. In summary each associate has the responsibility for delivery of complete subsystems meeting system performance requirements but each also is dependent upon equipment furnished by the other associate. The equipment is exchanged between associates on such terms and conditions as agreed between them so that each may fulfill its respective end item delivery requirement to the Government. The term used to identify the exchanged equipment is Associate Contractor Furnished Equipment (ACFE). Delivery of ACFE is based on terms and conditions established by the associates. The Government controls neither the configuration nor the delivery schedule. Except for recognized excusable delays, the Government assumes no obligation for late deliveries or for deficient ACFE.

Final acceptance of ACFE by the Government occurs when the Government accepts the complete end item which contains the ACFE. The Government does not warrant the ACFE; thus failure of the ACFE gives the Government the prerogative of rejecting the complete fire unit or missile. Again how the malfunctioning equipment is corrected is to be resolved by the two associates without Government involvement.

b. Advantages of Army Method.

(1) Integration of end items and major components is the responsibility of each associate. The Government is relieved, to a significant degree, from the increased managerial burden normally attached to associate contractors because systems responsibility is retained by the associate contra tors.

(2) As with the Air Force Method the "fee on fee" payment found in prime-subcontractor arrangements is avoided.

(3) The responsibility for contract performance is shared equally between two contractors. Each would seem more motivated to perform well than if a prime-subcontractor agreement existed. In a sense the associates are engaged in a quality "competition" to determine who is the best associate.

c. Disadvantages.

(1) The impact of the Army method on price competition is unknown. The purpose of using associate contractors on the Roland was for reasons other than price competition. In fact, competition is not considered a practical acquisition alternative at any time during the production cycle because of the special nature of the Roland program. As noted in par. G 2 c, the system was developed in Europe by a French/German consortium and the technology and production rights were transferred to the U.S. under a license agreement between the consortium and the Hughes/Boeing team. The teaming and associate contractor relationship on the Roland should not be confused. The teaming agreement between Hughes and Boeing applied only to the transfer of technology and the initial fabrication of the Roland in the U.S. For all intents and purposes the successful transfer of technology brought an end to the teaming agreement. The associate contractor arrangement was structured for the continuation of the production phase of the program.

(2) It may be that the method as employed on the Roland fits only a special set of circumstances and, hence, is not appropriate for competition purposes. Roland is a program that has included NATO RSI planning, R&D teaming, licensing and associate contractors. No other program has been complicated by as many unusual features.

4. Summary.

The associate contractor structure entails the Government entering into two or more prime contracts with different firms involved in producing major subsystems for a complex item. Its limited use in the past seems to have been to eliminate or reduce the administrative costs associated with the prime-subcontractor relationship. Air Force experience has shown that employing associate contractors can promote competition. The primary drawback to its competition usage is the problem of systems integration. This objection must be overcome either by Government assumption of the responsibility, a separate systems integration contractor, or ACFE provisions similar to those tailored for the Roland program.

I. COMPONENT BREAKOUT.

1. Definition.

Component breakout is the process of dividing an end item into its component parts so that the components may be bought directly from a manufacturer rather than from the end item prime contractor. The term "component" includes subsystems, assemblies, subassemblies and repair parts. Breakout is more broadly defined as the improvement in the acquisition of an item resulting from deliberate management action.[60] "Improvement" means buying the component at a lower price. Breakout can take place in two ways (Figure 9).

a. The competitive purchase of an item which was previously purchased noncompetitively from the prime contractor.

b. The direct noncompetitive purchase from the item manufacturer or vendor following previous purchases of the same item from the prime contractor.

2. General.

Component breakout recognizes that the Government pays a premium by buying components from a prime contractor when the components could be purchased directly from the actual manufacturer. The prime will tack a surcharge on the price he pays for the item to cover his handling expenses. This holds true whether the component is bought as a replenishment item for stocks or as Government furnished material (GFM). It stands to reason that eliminating the middleman, the prime contractor, will result in dollar savings to the Government. Component breakout is a formal program that is covered in DAR 1-313, "Procurement of Parts," DAR 1-326, "Component

---

60 AR 715-22, DOD High Dollar Value Spare Parts Program, Mar 1969.

COMPONENT BREAKOUT

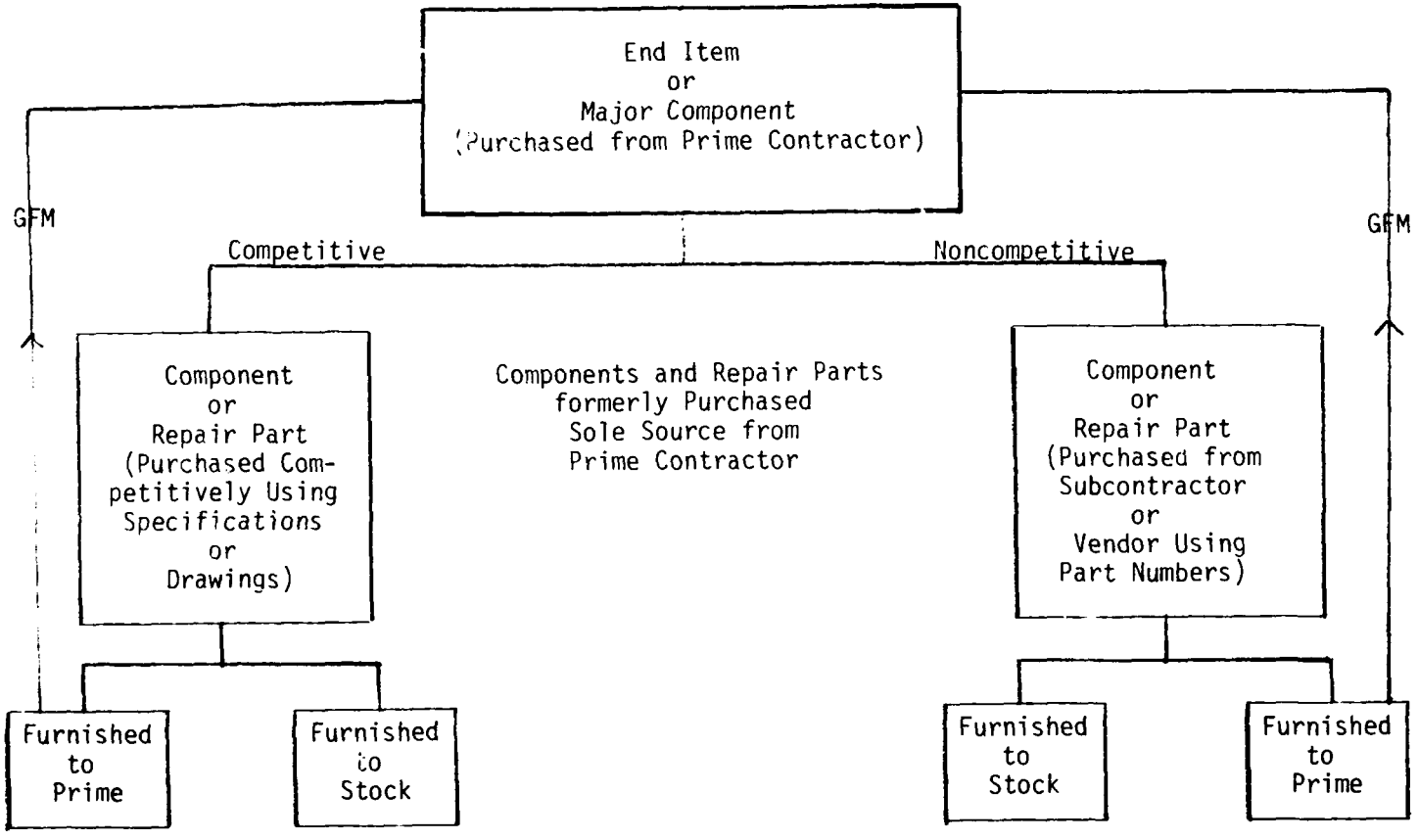


FIGURE 9. COMPONENT BREAKOUT